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CHARACTERIZATION AND EVALUATION OF WASHABILITY OF ALASKAN COALS

Fifty Selected Seams from Various Coal Fields

FINAL TECHNICAL REPORT

September 30, 1976 to February 28, 1986

P. Dharma Rao

Mineral Industry Research Laboratory
University of Alaska-Fairbanks
Fairbanks, Alaska 99775-1180

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ABSTRACT

This final report is the result of a study initiated in 1976 to obtain washability data for Alaskan coals, to supplement the efforts of the U.S. Department of Energy in their ongoing studies on washability of U.S. coals. Washability characteristics were determined for fifty coal samples from the Northern Alaska, Chicago Creek, Unalakleet, Nenana, Matanuska, Beluga, Yentna and Herendeen Bay coal fields. The raw coal was crushed to 1-1/2 inches, 3/8 inch, 14 mesh and 65 mesh top sizes, and float-sink separations were made at 1.30, 1.40 and 1.60 specific gravities. A limited number of samples were also crushed to 200 and 325 mesh sizes prior to float-sink testing. Samples crushed to 65 mesh top size were also separated at 1.60 specific gravity and the float and sink products were characterized for proximate and ultimate analyses, ash composition and ash fusibility.

Bituminous coals pulverized to 65 mesh dispersed quite well when dried and mixed in a blender. Subbituminous coals, however, could not be totally dispersed.

Six seams were sampled from the Northern Alaska field. The results showed that No. 7 bed, from Cape Beaufort containing 21.2 percent ash, can be washed to give a product analyzing 11.2 percent ash at 76.2 percent yield. The uncorrelated bed coal from Kokolik River gave a product with 2.55 percent ash, 0.24 percent sulfur at 81.26 percent yield. No. 3 bed coal from Elusive Creek can be washed to give an ultraclean product with less than 2 percent ash and 0.25 percent total sulfur for the sample crushed to 1-1/2 inches top size at 98.7 percent yield.

The results showed that the subbituminous "B" coals from Wainwright and Meade River can be washed to give an ultra clean product containing less than 3.5 percent ash at yields of 91 percent or better. One sample from Sagawon Bluffs in the eastern part of the field was very high in ash which could be reduced significantly, however, the yield would be very low.

The subbituminous "C" coal seam from Chicago Creek field, containing 15.1 percent ash, can be washed to give a product analyzing 8.8 percent ash at 86.7 percent yield.

The high volatile "C" bituminous coal from the Unalakleet field analyzed 11.2 percent ash. Washing will reduce ash to 7.0 percent at 96.0 percent yield.

The results showed that six subbituminous coals from the Nenana coal field, when crushed to minus 14 mesh and floated at specific gravity 1.40, yielded products ranging in heating values from 10,098 to 11,664 Btu/lb with 0.15 percent to 0.23 percent sulfur on a moisture free basis, making them among the most environmentally acceptable coals in the United States.

Three subbituminous "C" coal seams were sampled from the Nenana coal field, two of which were from Usibelli Coal Mine. Samples from numbers 1 and 3 seams can be washed at 1.60 specific gravity to give products with 10.9 percent and 9.2 percent ash respectively. Washing coal from Marguerite Creek gave a product with 10.1 percent ash.

Subbituminous "C" No. 4 bed coal, Nenana coal field, could provide a product with 9.6 percent ash and 10,854 Btu/lb at a 96.8 percent yield when crushed to 1-1/2 inches top size and cleaned at 1.40 specific gravity.

Two subbituminous "C" coal beds were sampled from the Nenana field. The Basal Bed A raw coal containing 19.5 percent ash, 0.40 percent sulfur can be washed to give a product analyzing 10.2 percent ash at 73.8 percent yield. The uncorrelated bed sampled from the bluffs along Upper Lignite Creek analyzed 12.8 percent ash and can be washed to give a product analyzing 9.4 percent ash at 88.6 percent yield.

High volatile "B" bituminous coal from Yanert Mine, Nenana coal field, gave very low recovery, however, the ash could be reduced from 53.2 to 13.6 percent by crushing to 3/8 inch top size and separating at 1.60 specific gravity.

A subbituminous C coal from the Jarvis Creek coal field yielded 84.9 weight percent of float 1.40 specific gravity product with 11,272 Btu/lb on a moisture free basis and 0.98 percent sulfur after crushing to 14 mesh top size.

The sample from the Eagle field had only 0.05 percent pyritic sulfur. The sample from Coal Creek gave 13.7 percent ash at 82.7 percent yield, and the sample from Chicken gave 18.8 percent ash at 76.1 percent yield.

The sampled high volatile "A" bituminous coal seam from the Nulato coal field was only 12 inches thick and contained more than 60% ash. However, the 1.60 specific gravity float product gave a free swelling index of 9.6 and a yield of only 19 percent, containing 10 percent ash and 0.97 percent sulfur.

The high volatile subbituminous coal from Tramway Bar coal field was high in ash. Washing the 1-1/2 inches top size coal at 1.60 specific gravity would provide a product with 11.5 percent ash and 0.27 percent sulfur with a calorific value of 11,523 Btu/lb.

The lower 30 feet of the Waterfall Bed from the Beluga coal field gave a float 1.40 specific gravity product with 7.2 percent ash, 0.20 percent sulfur and 11,222 Btu/lb at 92.7 percent yield.

The top 6 feet of Waterfall seam from the Beluga field contained considerable soft clay that accounted for much of the ash in the raw coal, which averaged 37.0 percent. Washing at 1.40 specific gravity gave a product analyzing 8.0 percent ash.

The Capps bed coal sample from the Beluga field could be upgraded to 7.5 percent upon crushing to 3/8 inch top size and cleaning at 1.40 specific gravity.

The subbituminous "C" coal sampled from Green bed in the Beluga field was quite low in ash; 8.25 percent on a moisture free basis. Washing gave a product analyzing 5.3 percent ash at 98.5 percent yield. All the above results are expressed on a moisture free basis.

Two subbituminous "C" coal beds were sampled from Yentna field.

The coal bed from Johnson Creek gave a product analyzing 7.5 percent at 71.1 percent yield when crushed to 14 mesh top size.

The coal bed from Canyon Creek gave a product analyzing 6.8 percent ash at 63.5 percent yield when crushed to 14 mesh top size.

Lignite from Yentna coal field has less than 5 percent ash in the raw coal and very little

sulfur, less than 0.15 percent. Washing would not significantly improve the quality of this coal.

The subbituminous "C" coal from Cabin Bed, Kenai coal field, near Homer crushed to 3/8 inch top size, can be washed at 1.40 specific gravity to give a product with 8.3 percent ash, 0.48 percent sulfur, and 1,189 Btu/lb with a 90.8 percent field.

Two subbituminous coals sampled from Kenai field gave products with acceptable ash. 1.40 specific gravity float product from Ninilchik analyzed 8.16 percent ash whereas the product from Happy Creek analyzed 9.03 percent ash. The total sulfur averaged less than 0.40 percent for both coals.

Six coal beds were sampled from the strip mine pit of the Evan Jones mine in the Matanuska field. These coals are best cleaned to make three products, i.e., a clean coal, middlings and rejects. The seams, by washing the 1-1/2 inch top size material at 1.40 specific gravity, will yield clean coal products ranging in ash content from 4.2 to 8.5 percent with yield ranging from 33.7 to 67.7. Further washing at 1.60 will yield products analyzing 21.3 to 26.6 percent ash at yields ranging from 56.2 to 92.5 percent.

A high volatile A and a high volatile B bituminous coal from the Premier Mine of the Matanuska coal field yielded 65.7 and 75.3 weight-percent of float 1.40 specific gravity product with heating values of 14,383 and 13,371 Btu/lb when crushed to 14 mesh top size. The sulfur in these two coals was very low (less than 0.50 percent) and was virtually all organic sulfur; therefore, no sulfur reduction occurred during washing.

Lignite from the Broad Pass coal field showed improvements in the 1.40 specific gravity product after crushing to 3/8 inch top size and gave a product with 10.6 percent ash at a 78.7 percent yield.

Coal from Dunkle bed coal, Broad Pass field, gave a product with 9.0 percent ash at 87.87 percent yield.

The subbituminous "C" rank sample of Little Tonzona coal bed gave an 8.9 percent ash product with 83.4 percent recovery for coal crushed to 1-1/2 inches top size. The sulfur in this coal is high 1.55, and with very little pyritic sulfur, therefore, washing will not improve the sulfur content.

Coal from Chignik Bay Coal Mine from the Chignik field contained 36.18 percent ash and could be washed at 1.60 specific gravity to give a product analyzing 11.0 percent ash.

The coal bed from Herendeen Bay field containing 43.6 percent ash and 1.91 percent sulfur can be washed to give a product analyzing 9.9 percent ash and 1.59 percent sulfur at 31.8 percent yield.

ACKNOWLEDGMENTS

The study was conducted under the sponsorship of the U.S. Department of Energy. The authors are especially grateful to Messrs. Joseph A. Cavallaro and Albert W. Deurbrouck, Pittsburgh Energy Technology Center, formerly with the Pittsburgh Mining Technology Center, U.S. Department of Energy, for their helpful suggestions during the course of the

investigation, and for their careful review of the final draft report.

Several organizations furnished financial and helicopter support to obtain samples of beds in remote locations. The Alaska Field Operations Center of the U.S. Bureau of Mines provided funds for sampling the Wainwright and Meade River coal beds. The Alaska Division of Geological and Geophysical Surveys was responsible for sampling and transportation of Little Tonzona coal from the field by air. They also furnished helicopter support and camping facilities for the author for sampling the coal bed at Locality 2 in the Yentna field. Beluga Coal Corporation, a subsidiary of Placer U.S. sampled the Waterfall bed in the Beluga field and air lifted the two 55 gallon drums of the sample. Cook Inlet Region, Inc. kindly gave permission to sample the Waterfall and Capps seams. Cooperation of Placer U.S., particularly Benno Patsch, in sampling and transportation is appreciated.

Sampling and transportation of samples from the Sagwon Bluffs was done while working on a project funded by the U.S. Bureau of Mines on the study of the mineral resources of the pipeline corridor. Cooperation of all these organizations is gratefully acknowledged. A field party of the U.S. Geological Survey, Anchorage, under the direction of James E. Callahan, provided lodging, helicopter support, sampling and transportation of samples. Coal Creek Mines, Inc. provided transportation for the Coal Creek sample. Usibelli Coal Co., Mr. Steve Denton in particular, helped in sampling seams. The Alaska Department of Fish and Game provided lodging and helped in the sampling of the Chignik and Herendeen Bay coals. Virgil Vial, operator of the Chicago Creek gold placer mine, provided lodging and backhoe work for exposing the coal seam and transporting coal samples across the tundra. The Mobil Oil Company kindly provided permission to sample seams on Johnson and Canyon Creeks in their lease areas. The authors wish to express special appreciation to the Unalakleet Native corporation for help in sampling, particularly Helga Eakon, general manager of the corporation.

Numerous individuals have helped in collecting the following samples. The bulk of sample sites were located in remote areas. The following are the individuals that were actually involved in sampling the beds; P. D. Rao, Steve Denton, Paul Metz, Mark Robinson, E.N. Wolff, Allen Ahlalook, Edmond Simmons, Cleland Conwell, Bonita Maynard, Benno Patch, Robert Hodel, Ravishankar Rao, Deborah DeLong, Sreenivas Rao, James E. Callahan, Gary Martin, Edward Ellwanger, David R. Maneval and Wu-Ming Chang.

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Thanks are due to Dr. Donald J. Cook, Dean, School of Mineral Engineering, Dr. Earl H. Beistline, Former Dean, School of Mineral Engineering, and Dr. Ernest N. Wolff, Former Associate Director, Mineral Industry Research Laboratory for their interest and encouragement in these coal investigations. Special thanks are due to Jane Smith for help in the preparation of the manuscript and to Cathy Farmer for typing the manuscript.

INTRODUCTION

Alaska has extensive coal deposits (Figure 1). Barnes (1967) estimates identified coal resources at 130 billion tons. Estimates based on oil well drill logs in Cook Inlet (McGee, 1976) and the North Slope (Tailleru and Brogge, 1976; Martin and Callahan, 1978) could place the coal resources of Alaska at several trillion tons, exceeding the resources of the rest of the nation. Alaska, therefore, could possibly supply the energy needs of not only this State but the nation as well.

Alaska can supply coal to lessen the nation's reliance on imported oil and reduce the balance of payments deficit by exporting Alaskan coals to other Pacific Rim belt nations and to the west coast of the United States. This coal would come from the Nenana and Matanuska fields, accessible to the Alaska Railroad, or from the Beluga field, accessible to a deep water port. A beginning has been made by the signing of an agreement by Usibelli Coal Co. with Suneel Alaska Corporation to supply 8 million tons of coal for export to Korea. Shipments commenced in 1985 and will average yearly exports of 880,000 tons. This alone will double current output.

There are three major undesirable substances in coal: sulfur, moisture and ash. Alaskan coals are found in nonmarine formations and this accounts for the low or zero pyritic sulfur content and consequently very low total sulfur. Moisture is the most undesirable of the constituents in Alaska's subbituminous coals and it has been addressed in a separate study by Rao and Wolff (1980). The extent to which ash and sulfur can be reduced depends to a large extent on the form of occurrence and is readily evaluated by standard washability tests. These involve crushing and float-sink separation of coals in organic liquids at varying densities, followed by chemical analysis and evaluation of the densimetric fractions.

Work on this project was started in 1976 with a grant from the U.S. Bureau of Mines and Usibelli Coal Mine. The grant was extended by the U.S. Department of Energy in 4 phases until 1982. The results have been published as four reports by Rao and Wolf (1979, 1980, 1982a, b). By this time washability analyses were completed for 50 samples crushed down to 14 mesh top size. In 1983 the Department of Energy initiated a grant to perform washability studies of the same 50 coals at 65 mesh and finer sizes. This report is a summary of all investigations conducted on washability of Alaskan coals since 1976.

COAL FIELDS SAMPLED

Fifty raw coal channel samples were collected for this study. Samples were obtained from freshly exposed surfaces of outcrops of weathered coal seams exposed by past mining activity. Six hundred pound samples were transported to the Laboratory in heavy duty plastic bags inside burlap gunny sacks. The samples were obtained from all major coal fields and principal coal occurrences.

Northern Alaska Coal Fields

The great bulk of Alaska's coal resources lie in the Northern Alaska coal field (Figure 1), north of the Brooks Range. Coal bearing Cretaceous rocks are known or inferred to underlie about 58,000 square miles (Barnes, 1967a; Barnes, 1967b). Figure 2 is a generalized facies diagram by Chapman and Sable (1960). They found that the coal beds in the Utukok-Corwin region, particularly those of potential economic significance, are confined almost entirely to the Corwin formation. The Cretaceous rocks include sandstone, conglomerate, siltstone, shale and coal. The Corwin formation consists predominantly of marine coal

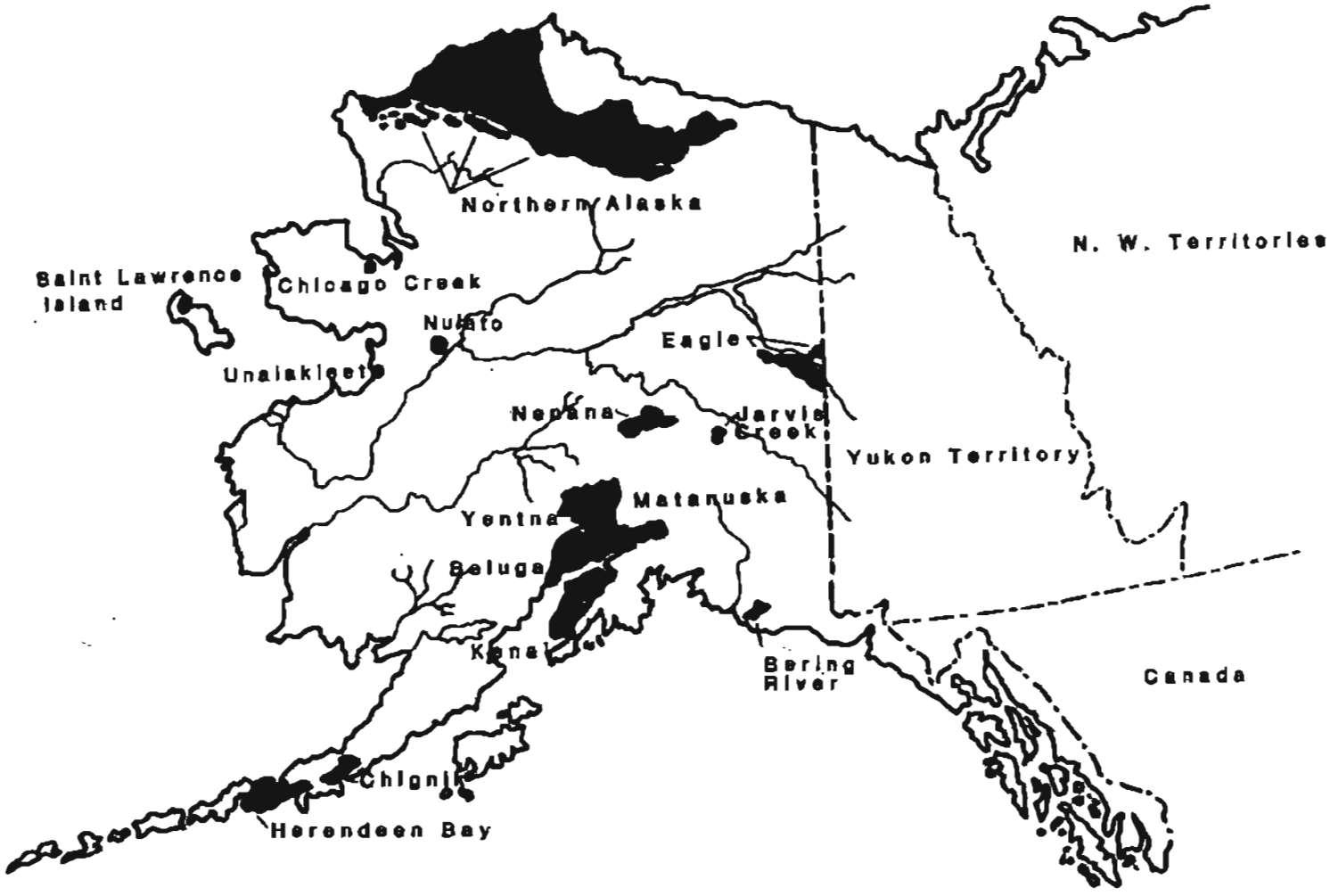


Figure 1. Major coal resources in Alaska.

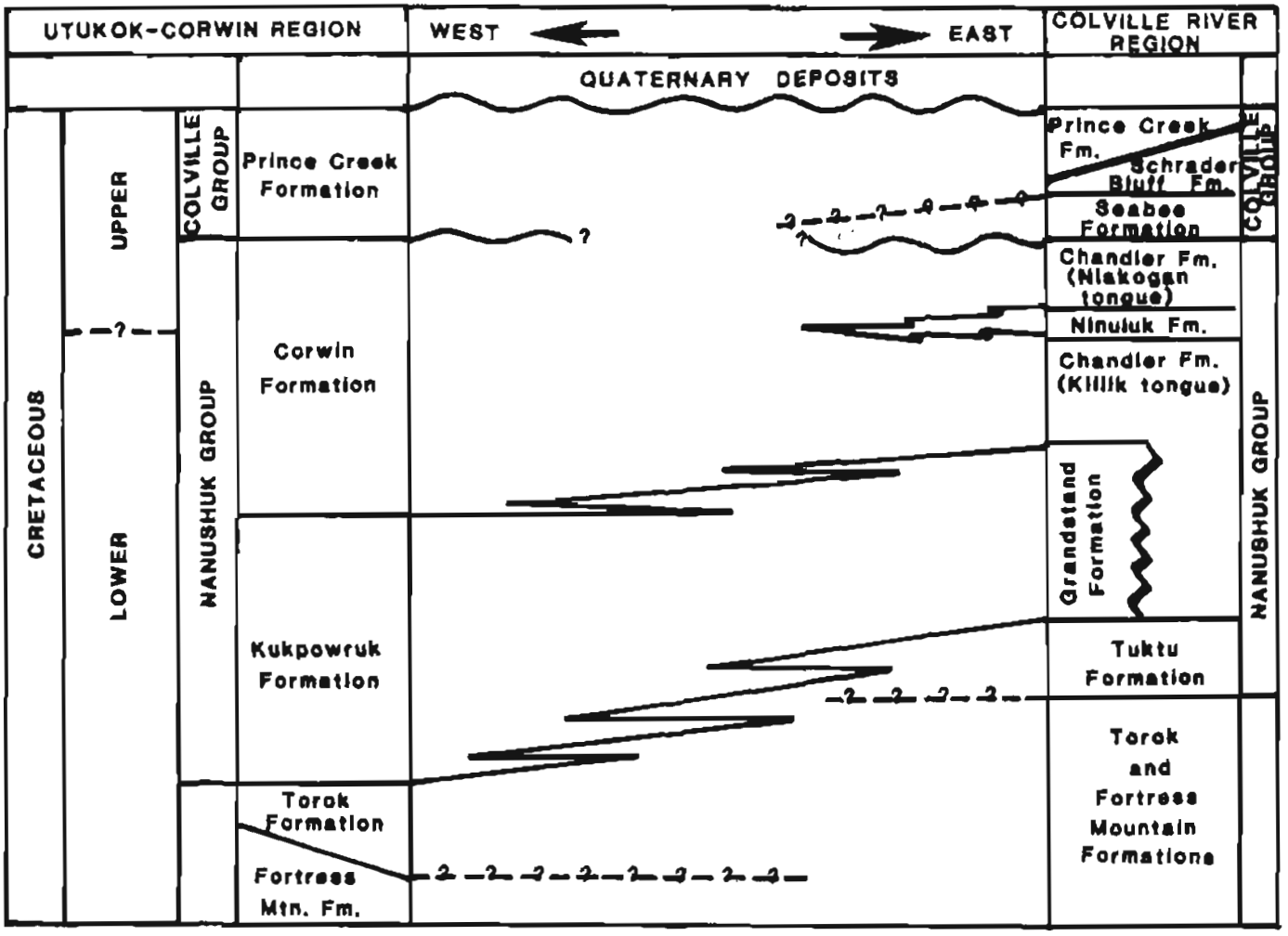


Figure 2. Generalized stratigraphic correlations rocks of the Northern Alaska field. Wavy lines represent unconformities. Chapman and Sable (1960, p. 70).

bearing rocks that intertongue with the Kukpowruk formation consisting of marine rocks. Based on outcrops along river banks, Barnes (1967a) subdivided the field into six fields.

1. Corwin Bluff - Cape Beaufort
2. Kukpowruk River
3. Kokolik - Utukok River
4. Kuk - Kugrua Rivers
5. Meade - Ikpikpuk Rivers
6. Colville River

Corwin Bluff - Cape Beaufort Field

Coal bed No. 7 (UA-139) is the thickest seam in the Cape Beaufort area (Figure 3). The U.S. Bureau of Mines exposed fresh surfaces of the seam by cutting a trench with a bulldozer (Figures 4 and 5) and sampled the seam excluding high ash partings (Warfield and Boley, 1969) (Figure 6). UA-139 is equivalent to sample 21 of Warfield (1969) with the exception that the entire seam was sampled. During the 1972 drilling, Bed 7 was cut at five locations and in 1973 by an auger hole, establishing continuity of the bed (Callahan and Sloan, 1978, p. 13-15). Figure 7 is a composite geological column of beds at Beaufort. Petrological mineralogical and chemical characteristics of the drill samples were reported by Rao (1980). Callahan (1975) estimated the total coal resources for the Cape Beaufort field as 533 million tons which includes 35 million tons of measured resources.

Kokolik - Utukok River Field

Two coal seams were sampled from the Kokolik-Utukok River field, outcropping along the banks of Elusive Creek and Kokolik River.

A sample of uncorrelated coal bed (UA-126) was obtained from an outcrop on the west bank of the Kokolik River (Figures 8, 9, 10, 11). The bed is 11.6 feet thick and the bottom of the bed is approximately 10 feet above the river level. The seam has 5 feet of overburden at the outcrop.

The location of this sample is approximately the same as the one used by the U.S. Bureau of Mines in their 1964 sampling and is equivalent to their sample No. 14 (Warfield and Boley, 1969) and sample No. SS-75-55 of Callahan and Sloan (1978, p. 21). Martin and Callahan (1978) estimate hypothetical coal resources of the Nanushuk group in the coastal plain and northernmost part of the foothills of the National Petroleum Reserve in Alaska (NPRA) to be 848 billion tons. The estimate does not include resources west of NPRA, and is based on meager available surface exposures, tracing outcrops with auger holes and seismic record sections.

A sample of coal bed No. 3 was obtained from the west bank of Elusive Creek (UA-125) which flows into Utukok River. The bed is 11.5 feet thick and has 6 feet of overburden. The bed dips away from the creek and is 5 feet above river level at the sampling point (Figures 12, 13, 14, 15).

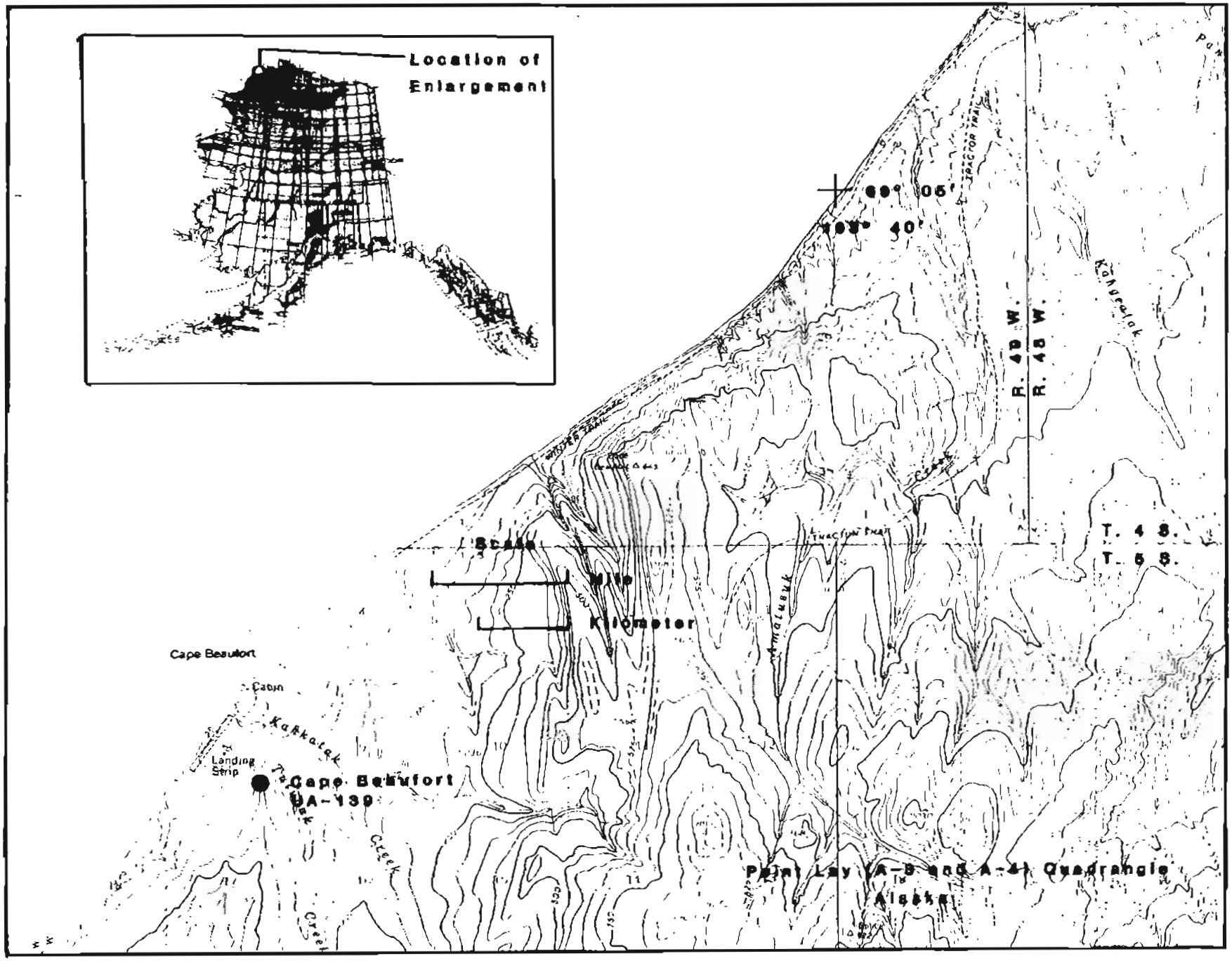


Figure 3. Location of sampling site at Cape Beaufort in the Northern Alaska field.

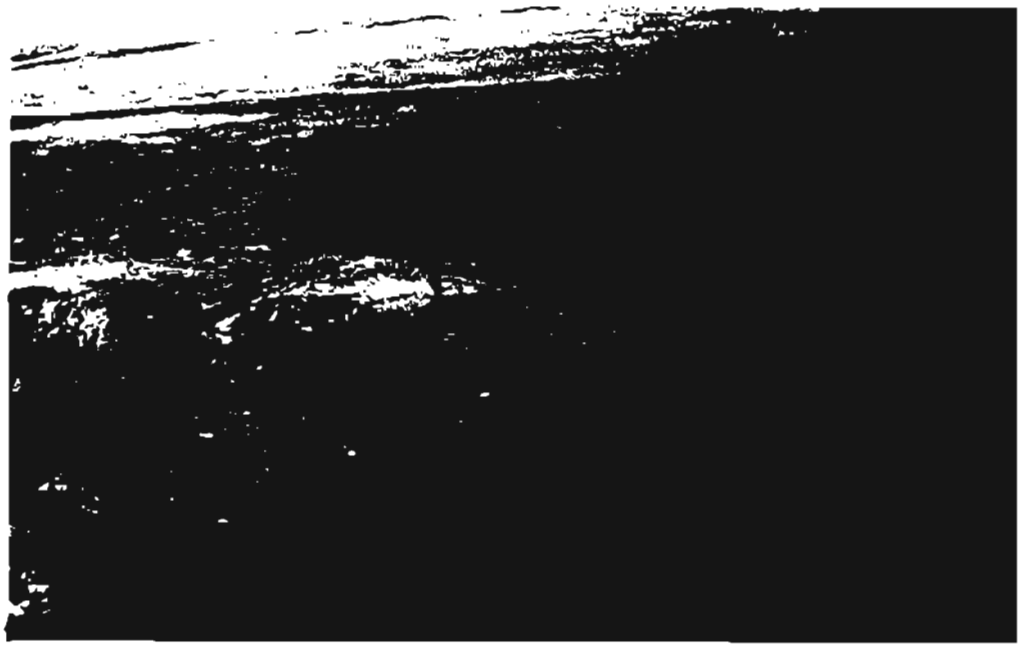


Figure 4. Aerial view locating U.S. Bureau of Mines trench near Cape Beaufort. Sample UA-139 was sampled from this trench.

Figure 5. A closeup view of UA-139 sampling site.

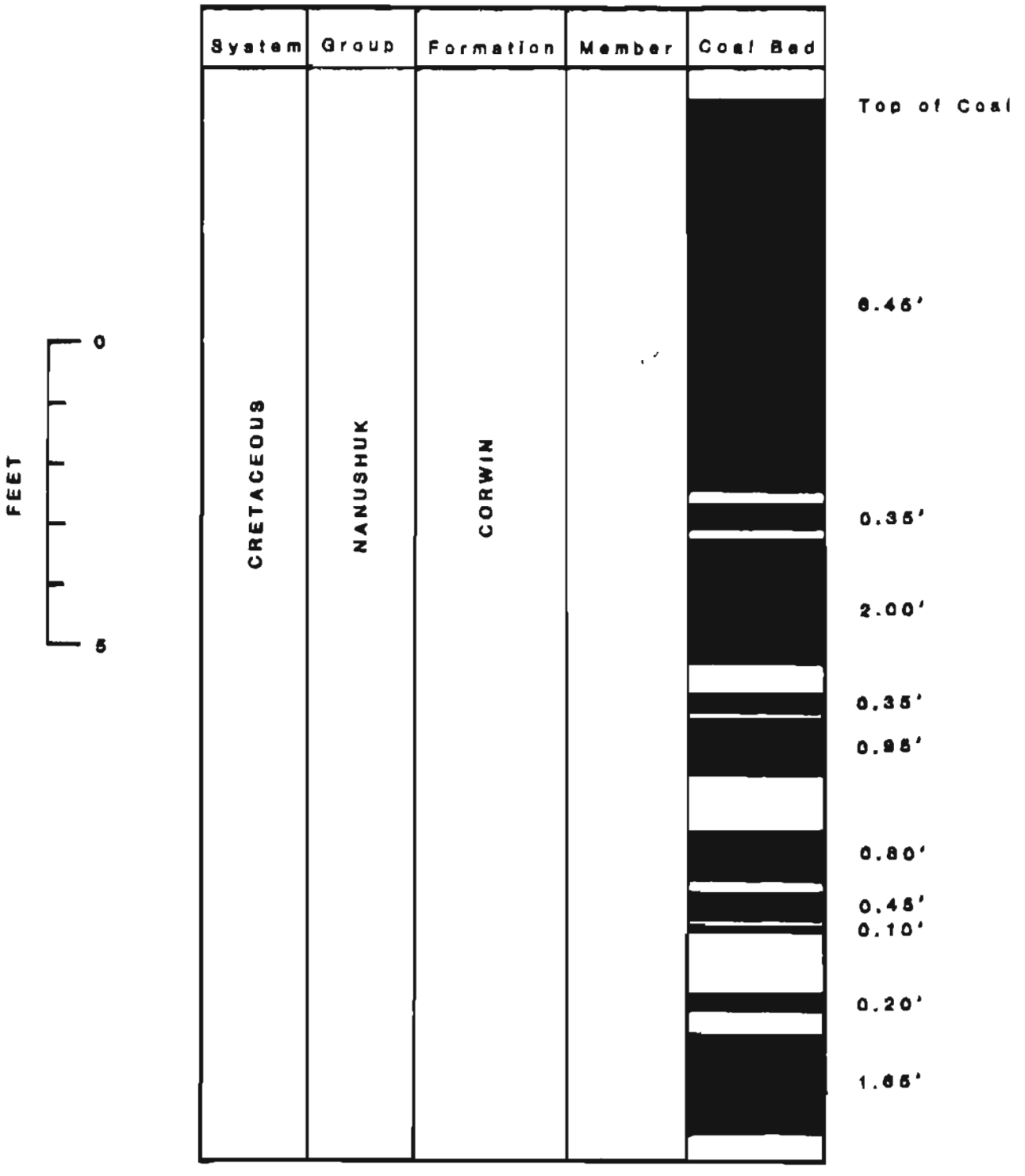


Figure 6. Geological column showing coal and partings in Bed 7 (UA-139), Cape Beaufort area, Northern Alaska field.

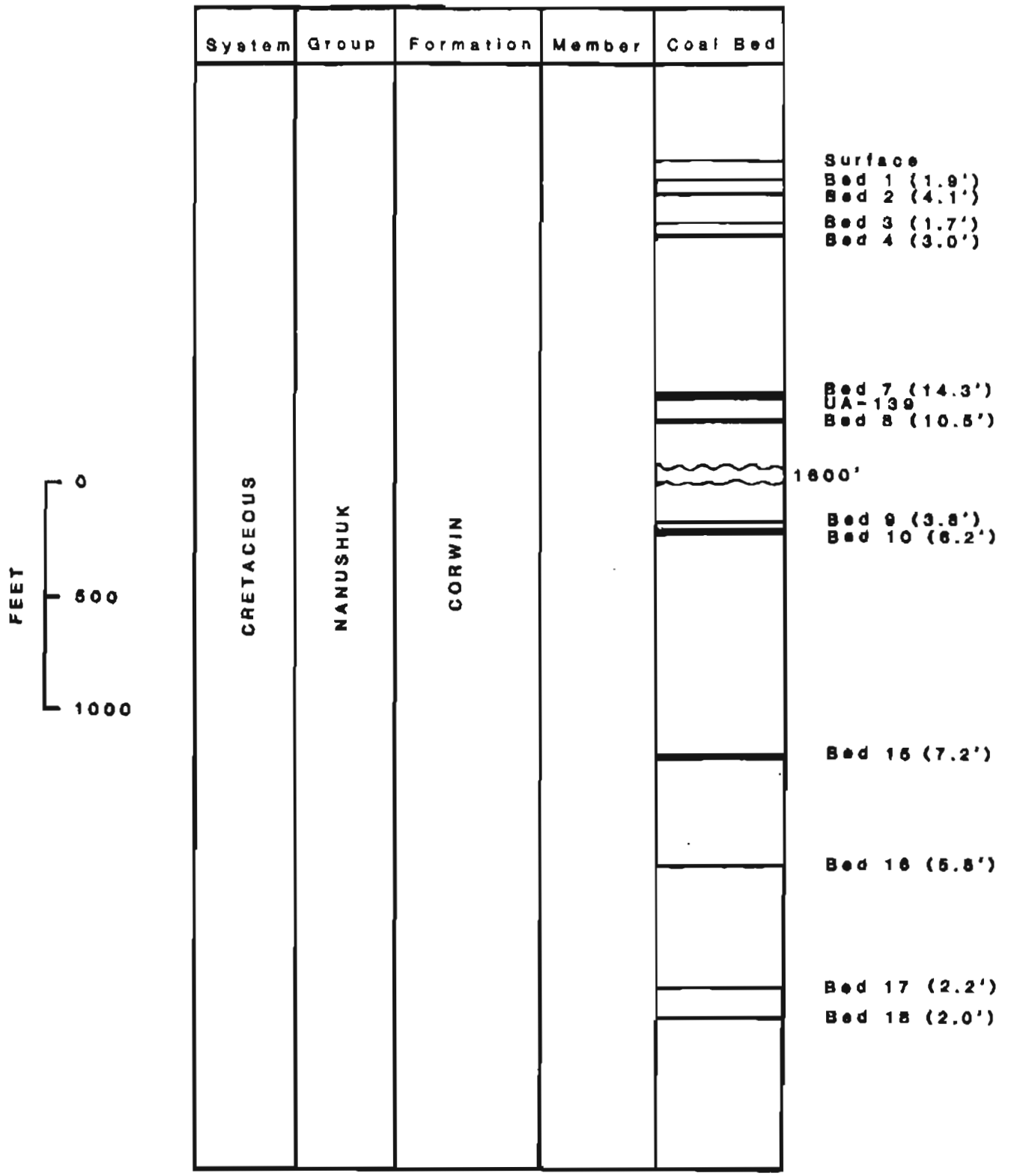


Figure 7. Geological column showing mineable coal beds, Tulugak Creek, Cape Beaufort area, Northern Alaska field.

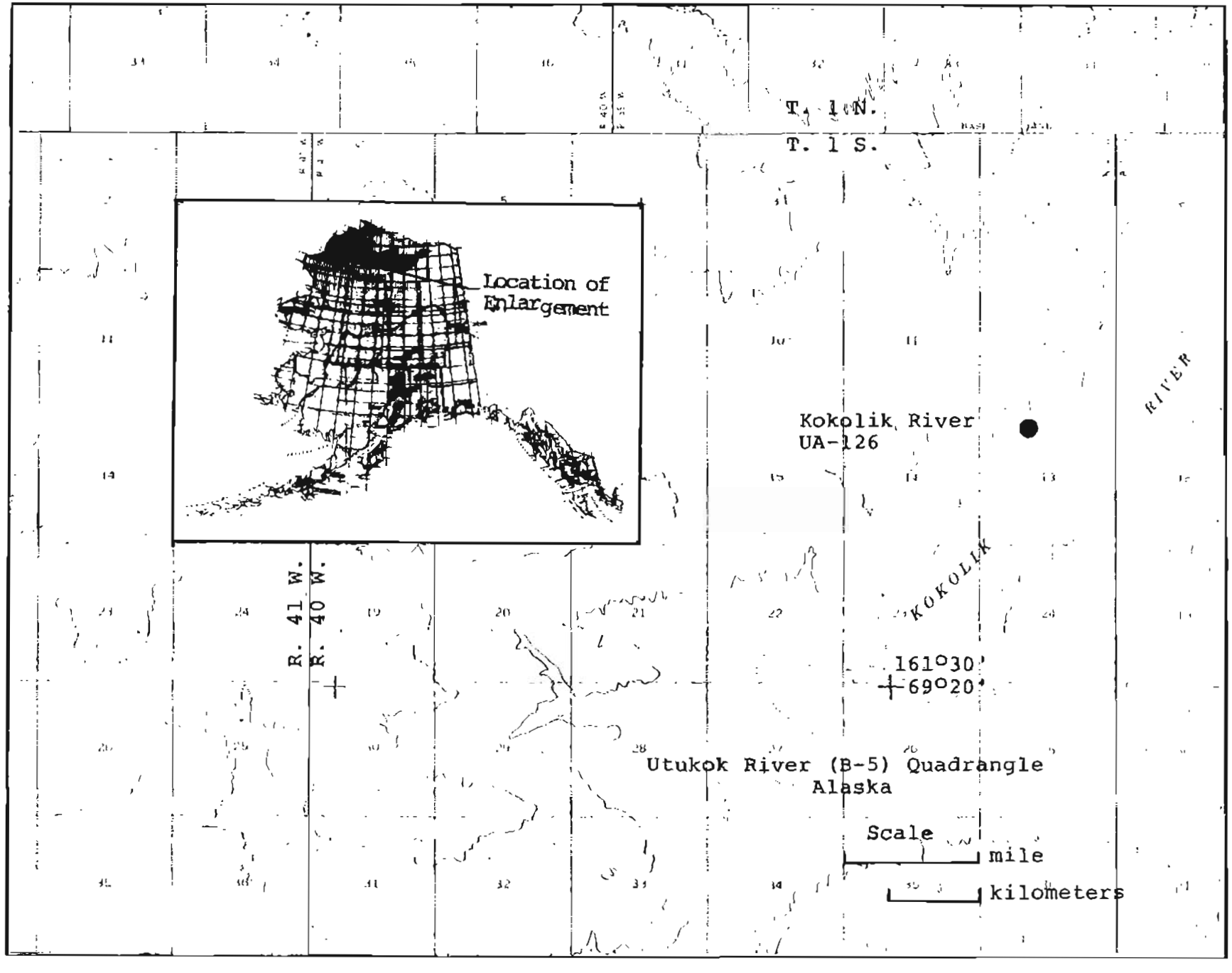


Figure 8. Location of sampling site on the Kokolik River, Northern Alaska field.

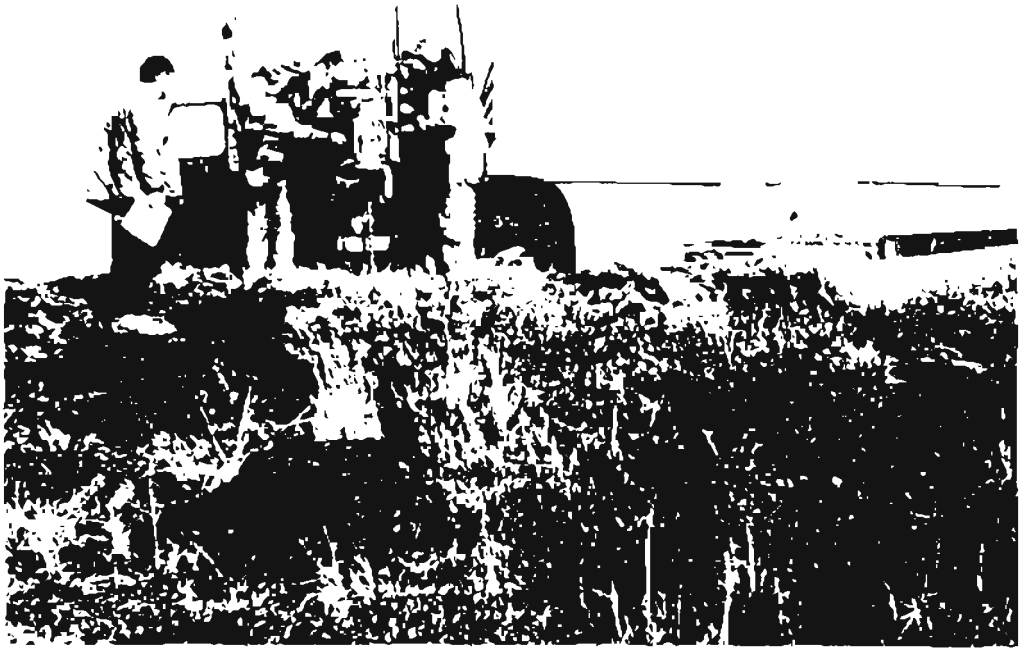


Figure 9. Augur sampling of coal seams by U.S. Geological Surveys crews in the National Petroleum Reserves in Alaska. Coal dug by ground squirrels may be seen in the foreground, and is used to locate outcrops hidden under tundra from air.

Figure 10. A closeup view of coal outcrop on Kokolik River.

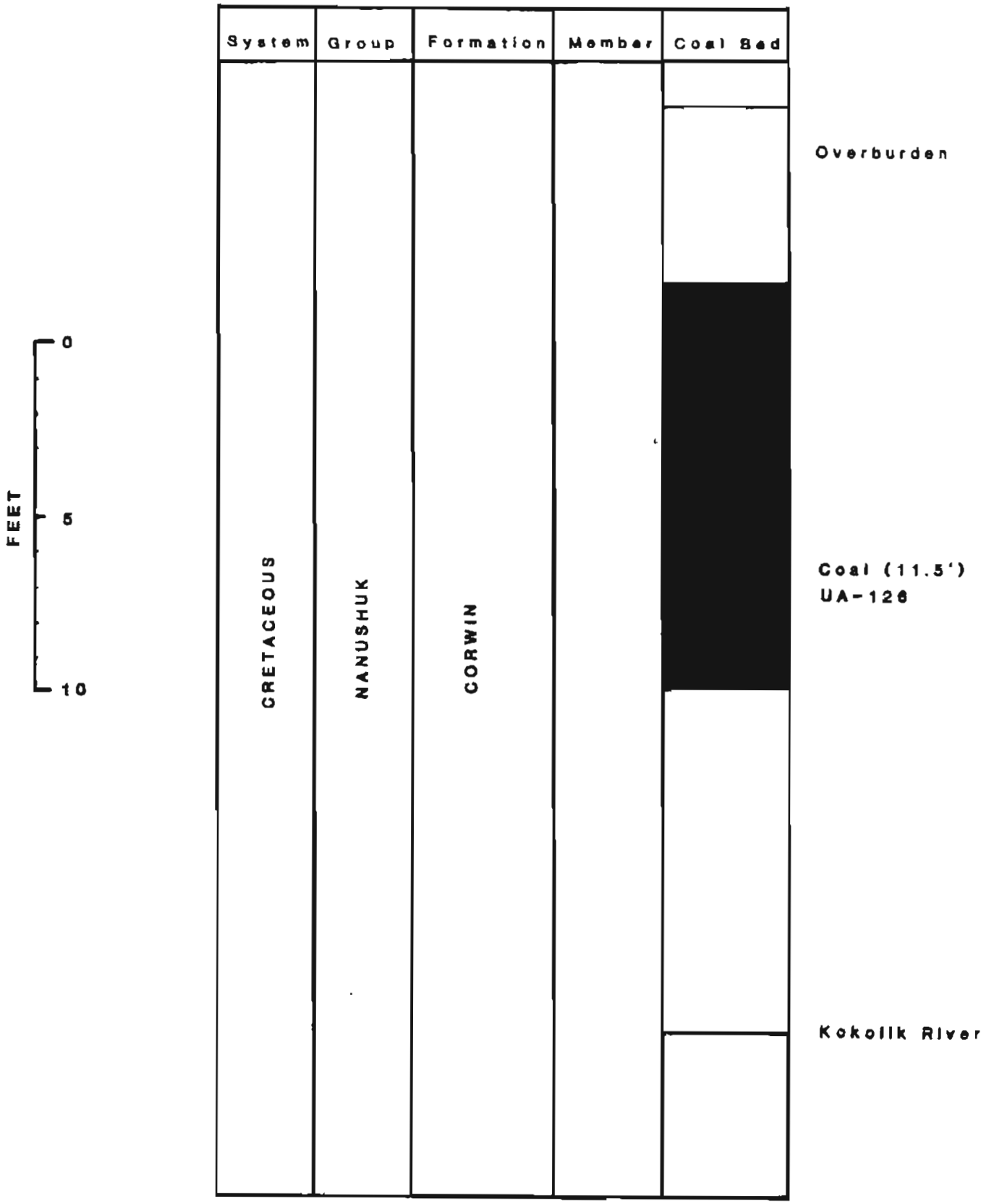


Figure 11. Geological column showing mineable coal bed on the Kokolik River, Northern Alaska field.

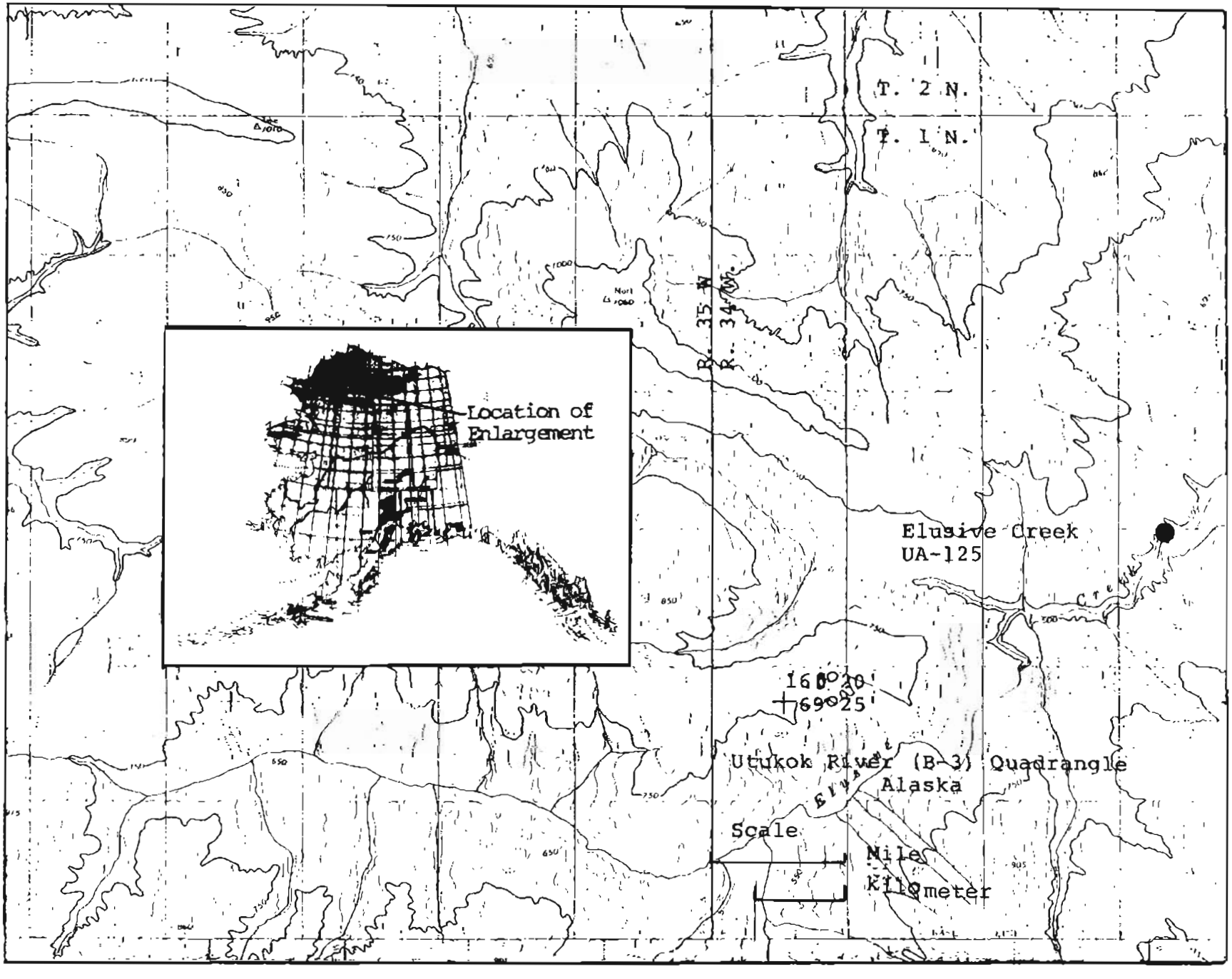


Figure 12. Location of sampling site on the Elusive creek, Northern Alaska field.

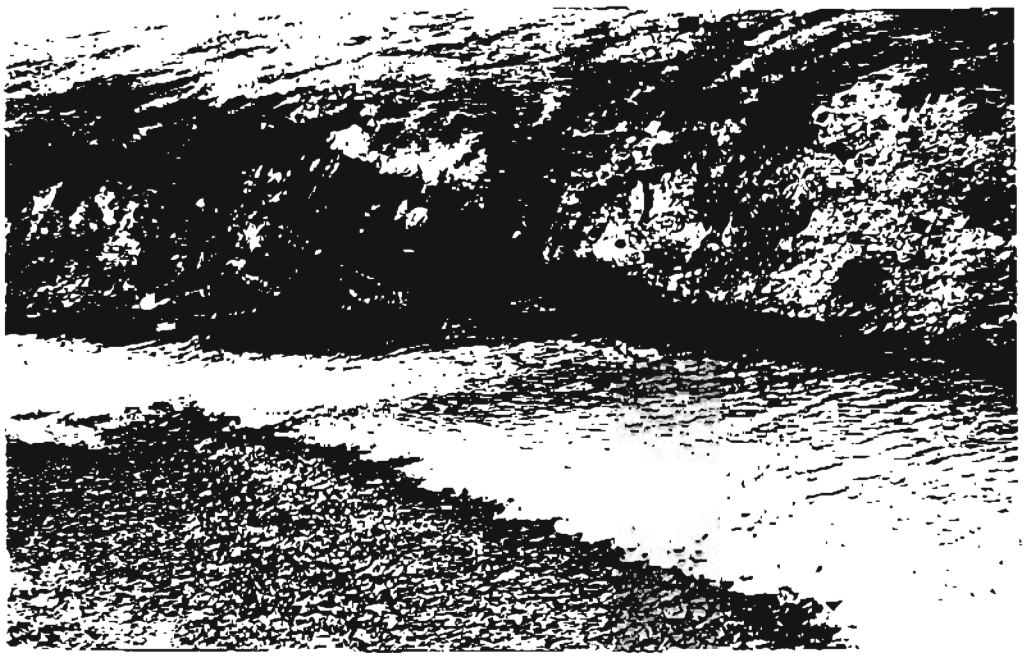


Figure 13. Aerial view of coal outcrop on Elusive creek.

Figure 14. A closeup view of coal outcrop on Elusive Creek. James E. Callahan (left) and Gary Martin, both of U.S.G.S.

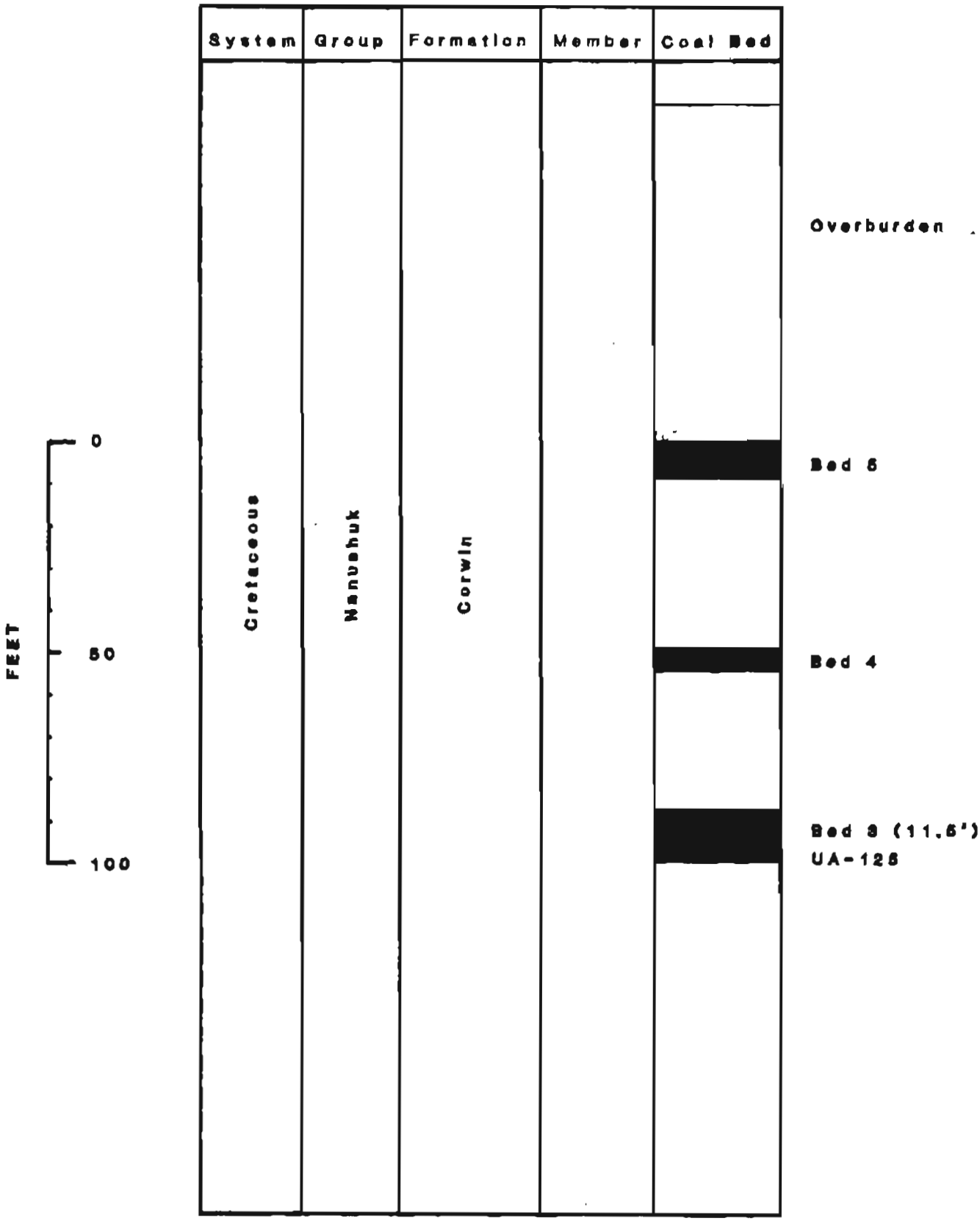


Figure 15. Geological column showing mineable coal beds on Elusive creek, Northern Alaska field.

This is bed No. 3 of Callahan and Martin (1980). Auger samples of this bed collected by them at a depth of 30 feet or greater had dry, ash-free heating values ranging from 14,381 to 14,777 Btu/lb (-P7). Assuming an equilibrium moisture content of 11.95%, the measured value for the outcrop samples, the ASTM rank of this coal would be between high volatile B and C.

Kuk - Meade River Fields

A sample from an uncorrelated coal bed (UA-109) was obtained from an outcrop on the east bank of the Kuk River, about 14 air miles from Wainwright (Figure 16, 17). The bed is 5 feet thick and the bottom of the seam is approximately 4 feet above the river level. The stratigraphic position of this bed has not been definitely established, but according to Barnes (1967a; 1967b), it is believed to be in rocks correlative with the Chandler formation (Figure 2). Coal outcrops have been described and, in fact, some have been mined for a distance of 10 miles along the Kuk River. There are two uncorrelated coal beds exposed at the outcrops with approximately 10 feet of coal. The individual beds range in thickness from two to 6 feet and 10 to 50 feet overburden outcrop along the Kuk River (Tonges and Jolley, 1947). Barnes (1967a; 1967b) estimates indicated resources for the Kuk River (Wainwright) district at 62.6 million tons and inferred resources at 1,395 million tons.

Meade River Field

A sample of the No. 2 coal bed (UA-110) was collected in the Meade River area. Coal outcrops along the west bank of the Meade River near the village of Atkasook (Figure 18, 19). Coal has been mined during the 1940's and early 1950's in an open trench and underground for shipment to Barrow. The U.S. Bureau of Mines has done extensive drilling in this region and delineated the coal bearing areas for mining purposes (Sanford and Pierce, 1946). Four coal seams have been identified in this locality. The No. 1 bed is 34 inches thick, the No. 2 bed is five to 6 feet and the No. 3 and No. 4 beds are approximately 12 inches and the beds are separated by 1 to 2 feet of clay.

Northcentral Alaska Field

A sample of Uncorrelated coal bed (UA-114) was collected from an outcrop in the Sagwon bluff area. Rocks in the Sagavanirktok quadrangle (Ferrians, 1971) are part of a thick sequence of submarine volcanic and nonmarine carbonate rocks of Mississippian through Tertiary age. Coal has been reported in Ignek formation of Cretaceous age and Sagavanirktok formation of Tertiary age. The sampled coal outcrop (UA-114) was from the bluffs on the Sagavanirktok River (Keller, et al., 1961) adjacent to the Trans Alaska Pipeline (Figure 20). The sampling location has not been mapped in detail and the age of the formation that the coal occurs has not been determined (Cretaceous to Tertiary).

NORTHWEST ALASKA COAL FIELDS

Chicago Creek

Coal was first discovered near Chicago Creek in 1902 by gold prospectors. Mining was done only during winter months. Henshaw (1910) presented a detailed description of the mine workings after his visit to the mine in 1908. He also sampled the coal at nine points. The coal bed measured by Henshaw was 88 feet thick. Mining was done by means of an inclined shaft that followed the outcrop. The Chicago Creek coal has proved an important factor in the development of the Candle Creek placers.

During the 1980 visit by the author, timbers and other evidence of past mining activity

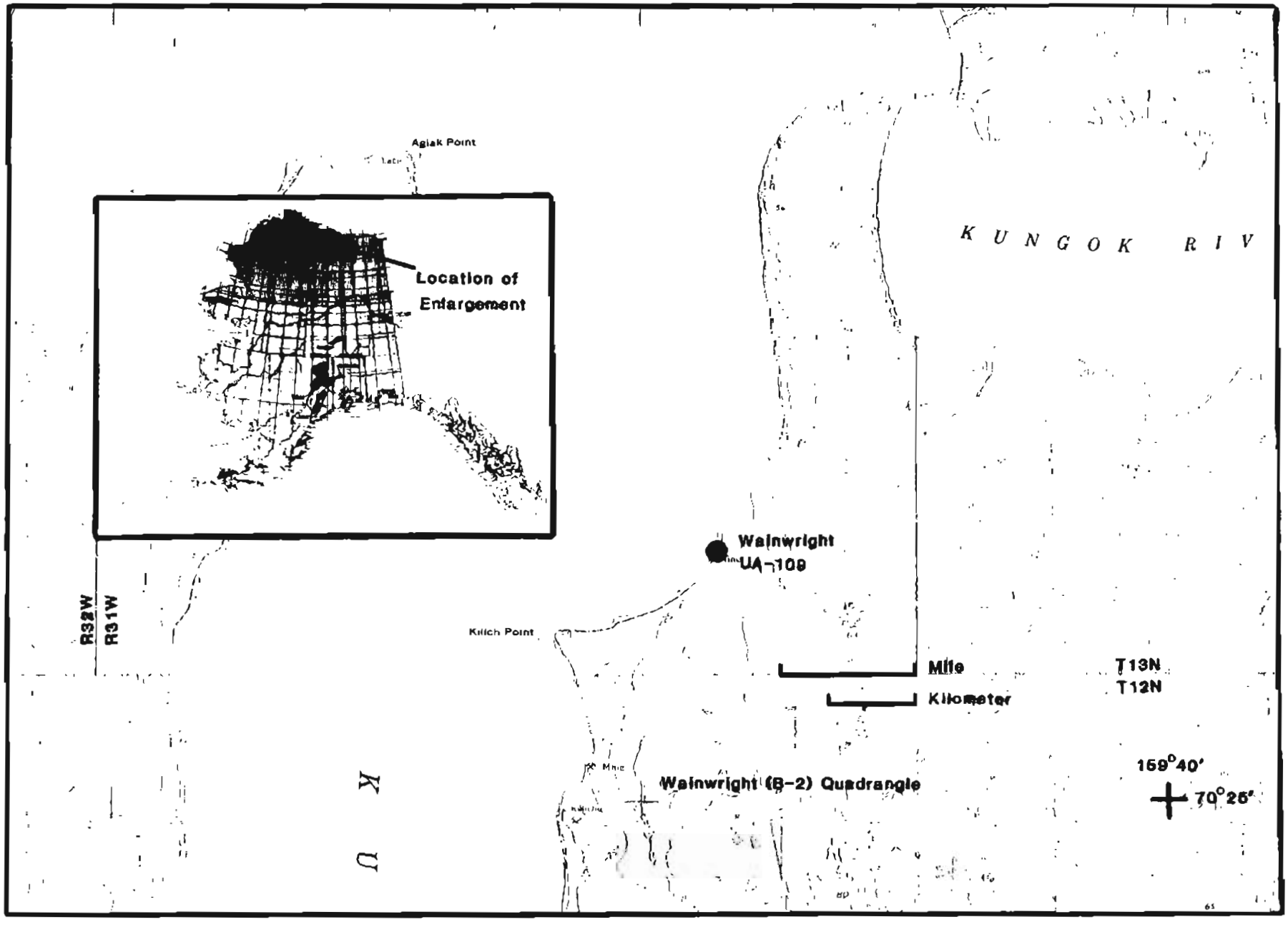


Figure 16. Sampling location on the banks of Kuk River, Northern Alaska field.

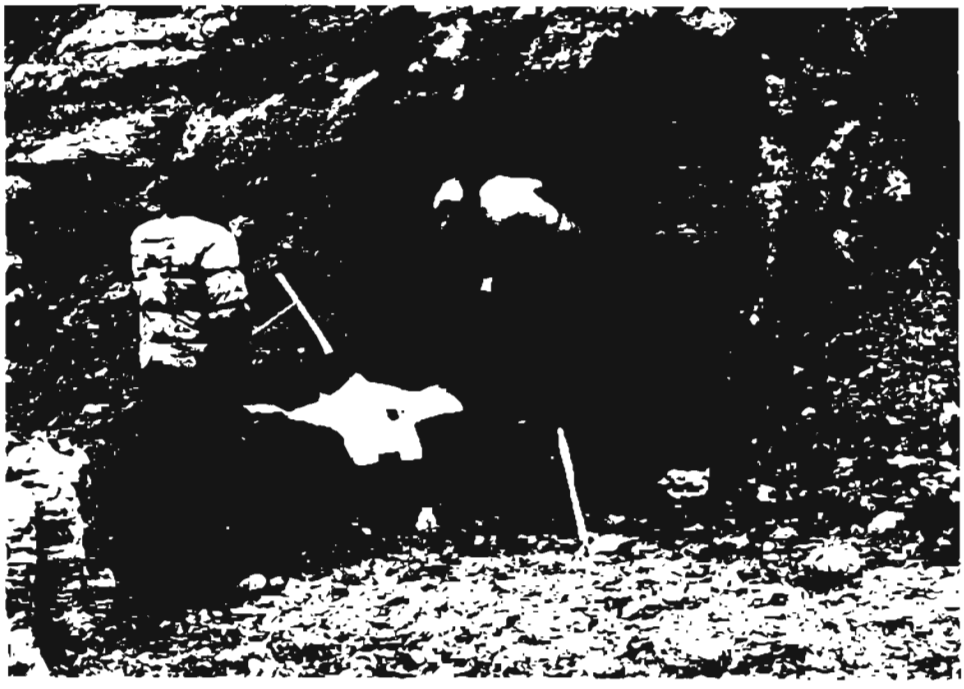


Figure 17. A closeup view of coal outcrop on Kuk River.

was evident. However, he was unable to locate the outcrop or the 88 feet thick coal seam or the shaft used for the past mining activity. Timber, found on the creek level, could be covering the shaft, but the evidence was not conclusive. However, a three foot coal seam was uncovered by digging with a back hoe (Figure 21) and a sample of this seam was collected for the study (UA-138). In 1982, the State of Alaska funded an exploration program carried out by initially by Stevens Exploration Management Corporation (Manning and Stevens, 1982) and completed by Hawley Resource Group Inc. (Retherford, Hinderman and Hawley, 1986). Based on drilling completed thus far, they estimate the potentially mineable identified coal resource at Chicago Creek at 4.7 million tons. Figure 22 is a projection of the steeply dipping coal seams.

Unalakleet

A sample of uncorrelated coal bed (UA-151) was obtained from an outcrop 8 miles south of Unalakleet on the shore of Norton Sound. This outcrop is on the beach bluff in the vicinity of past mining activity (Figure 23). The age of this outcrop was not investigated. Patton (1973) reported that a written communication from E.B. Leopold in 1966 reported the following: a sample of coal collected from a badly slumped beach bluff 10 miles south of Unalakleet on the shore of Norton Sound contained an abundant pollen flora of Early Tertiary age.

INTERIOR ALASKA COAL FIELDS

Nenana

The Nenana coal field is located about 110 miles south of Fairbanks on the Parks Highway

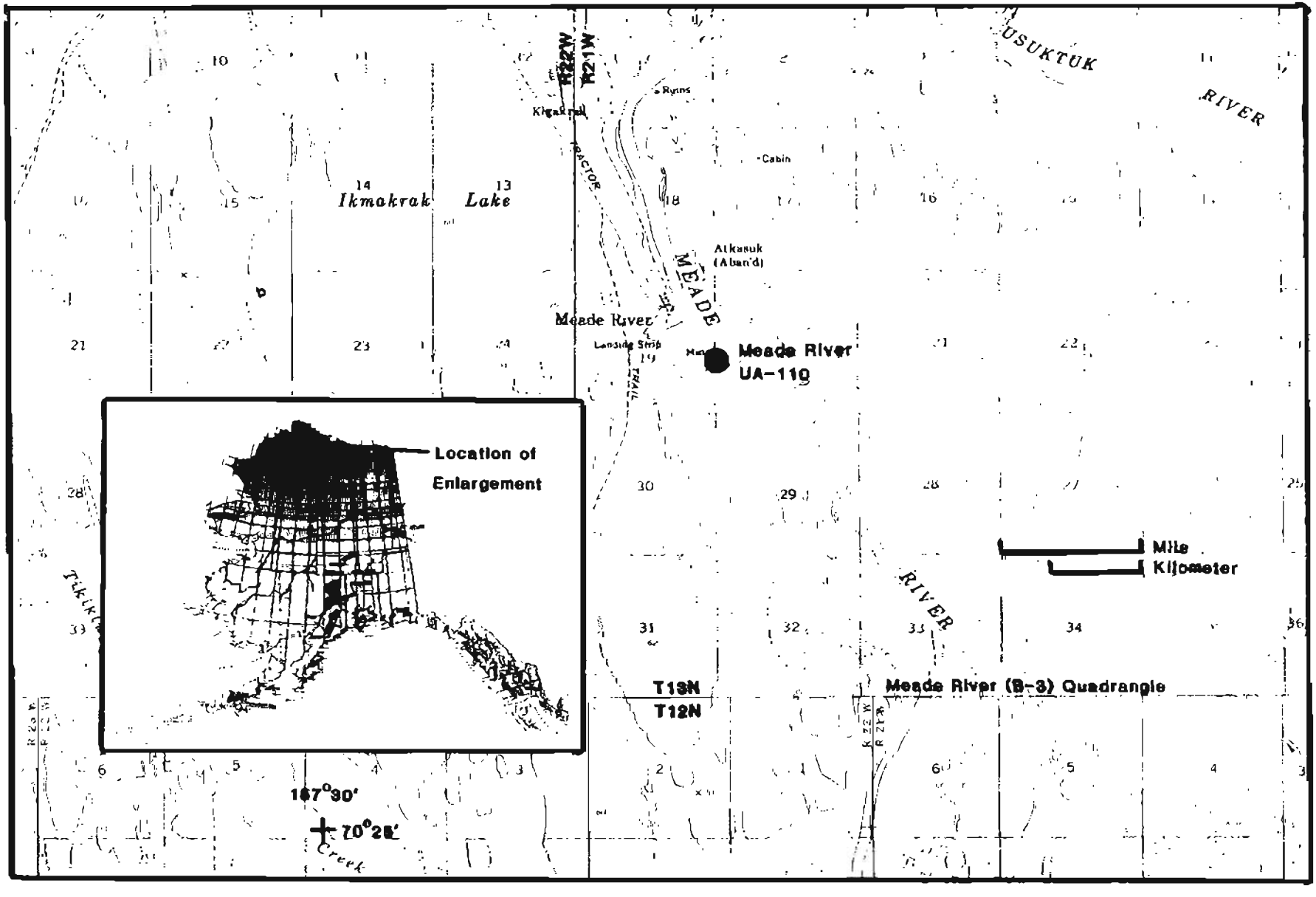


Figure 18. Sampling location of Meade River, Northern Alaska field.

Figure 19. A closeup view of coal subcrop on Meade River.

at Healy. The field extends 80 miles in an east-west direction and is one to thirty miles wide (Wahrhaftig et al., 1951; Wahrhaftig, 1951; Wahrhaftig and Birmon, 1954). The coal bearing formation consists of sandstones, siltstones, claystone, shale and numerous thick coal beds, and is divided into five formations by Wahrhaftig et al. (1969). Thirteen samples were collected from the Nenana field. The location of twelve of these samples is shown in Figure 24.

Barnes (1967a) estimates the original resources of the Nenana field at seven billion tons, of which three billion tons are on Lignite Creek. Accurate estimates of recoverable reserves for individual seams are not available. Total proven reserves in the Lower Lignite Creek area are 80 million tons with a resource potential of 250 million tons (Denton, 1980).

Figure 25 is a generalized geological section showing coal beds exposed at Suntrana and Healy Creeks. No. 2 Seam (UA-105) was sampled in this sequence. Figure 26 is a general view of coal exposed at the headwaters of Upper Lignite Creek. UA-141 was sampled from this location.

Figure 27 is a geological section of seams exposed on Upper Lignite Creek. Moose seam (UA-103) of this section has been correlated to F seam in Figure above. Caribou (UA-104) and Bear seams, however, have not been correlated to seams in other parts of the coal field.

The Lower Lignite Creek Basin, which extends three miles in an east-west direction and is three miles wide, is the site of the current mining of Usibelli Coal Mine. Mineable coal

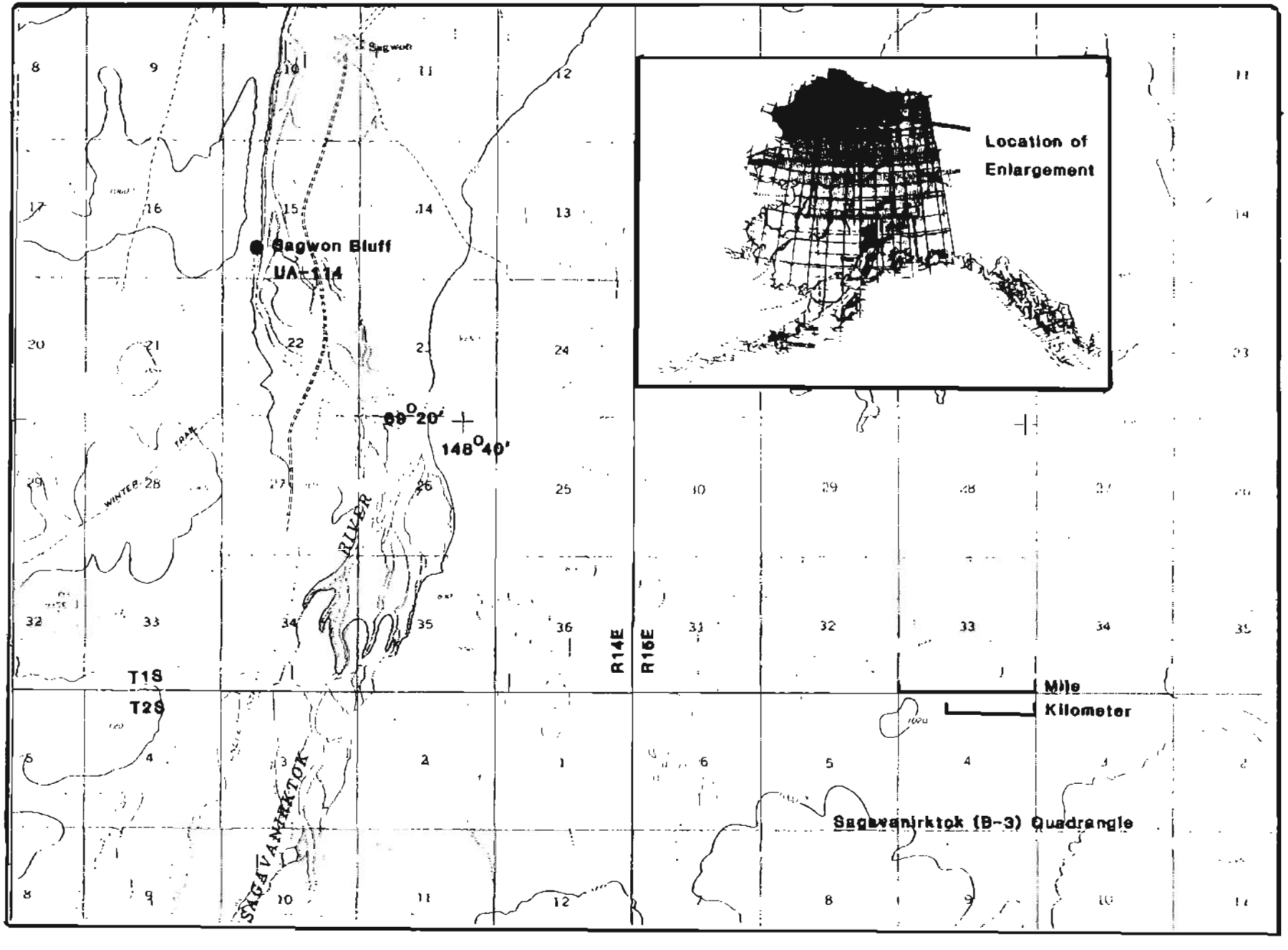


Figure 20. Sampling location at Sagwon Bluff, Northern Alaska field.

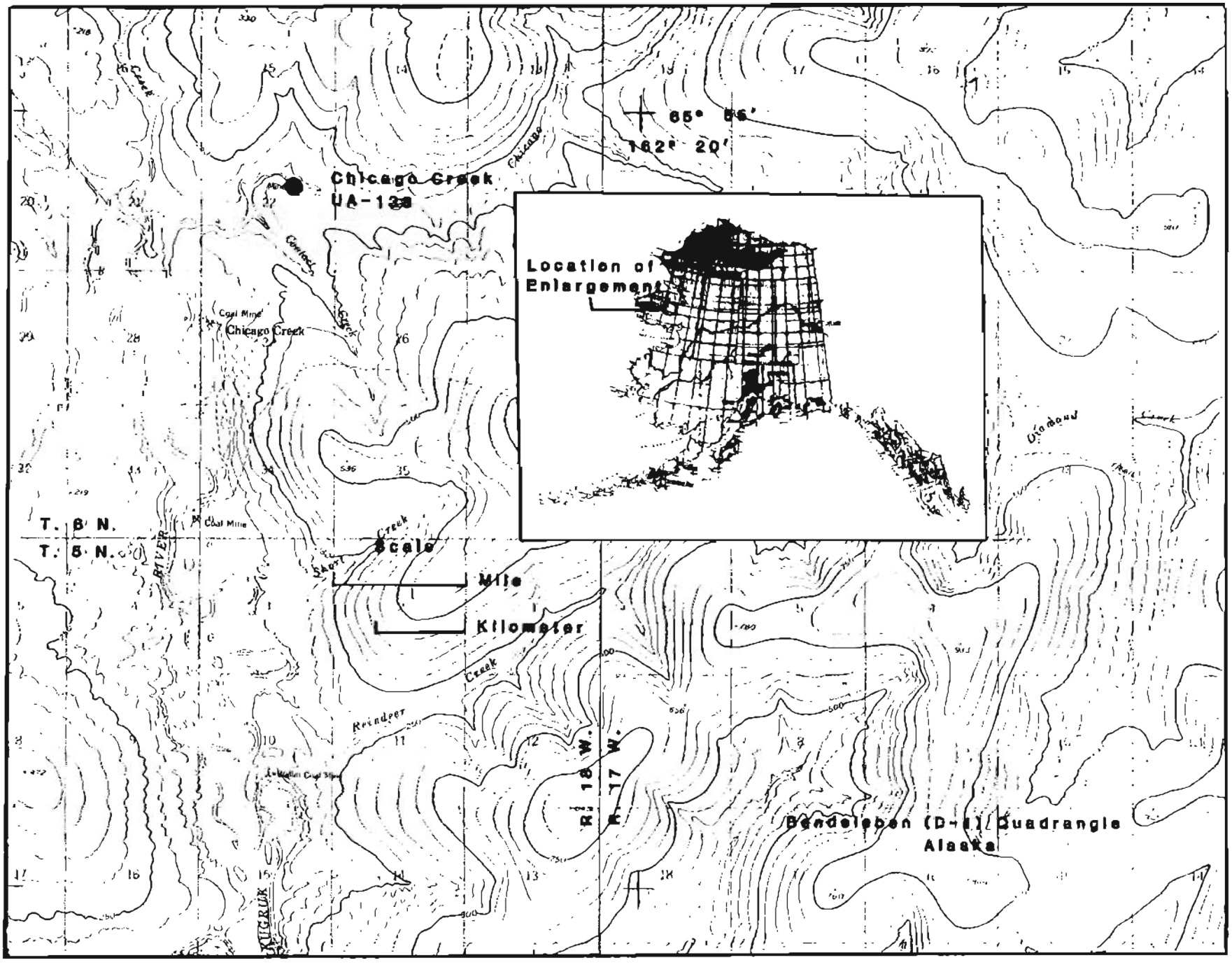


Figure 21. Location of sampling site at the Chicago Creek coal deposit.

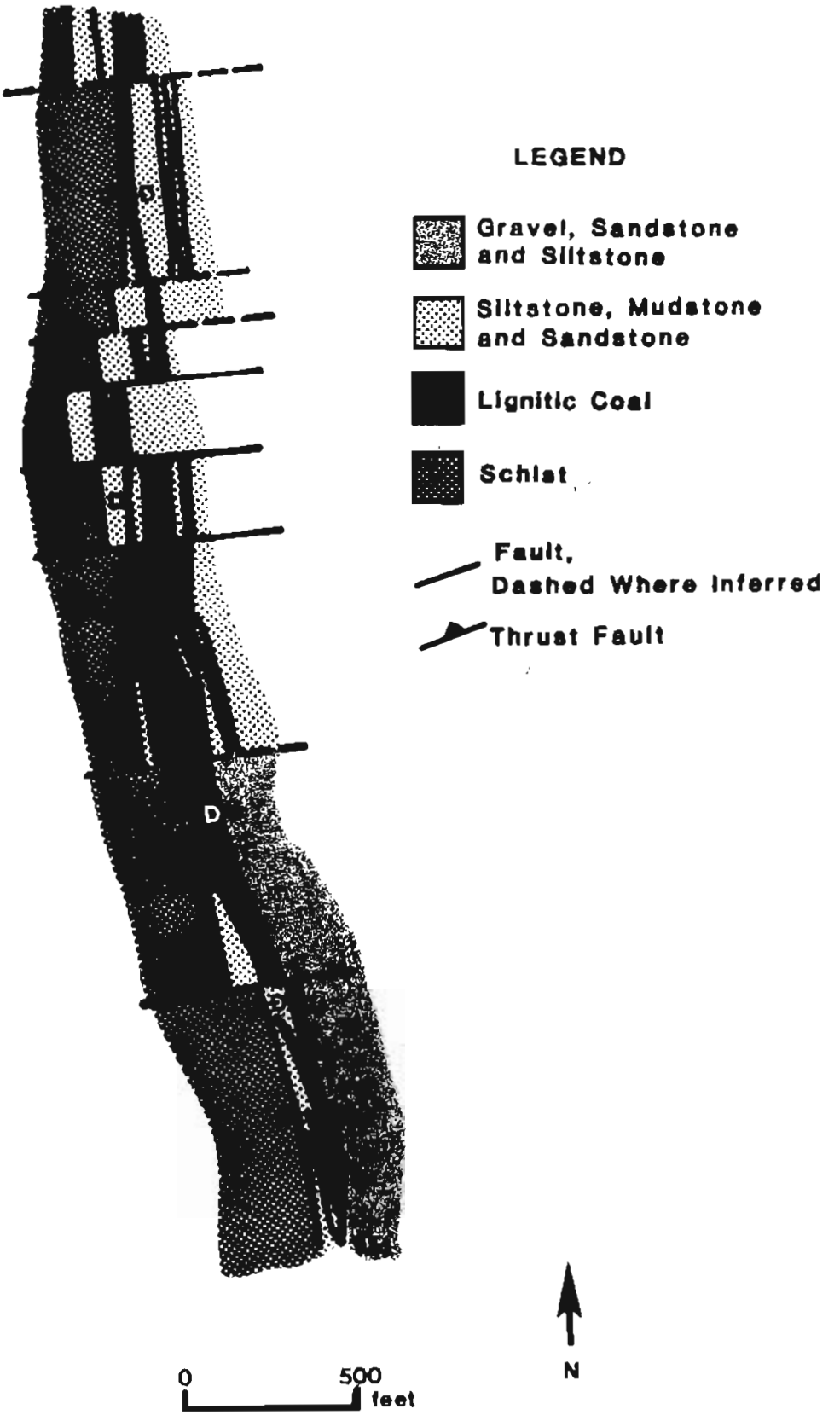


Figure 22. Geological section of coal beds at the Chicago Creek coal deposit.

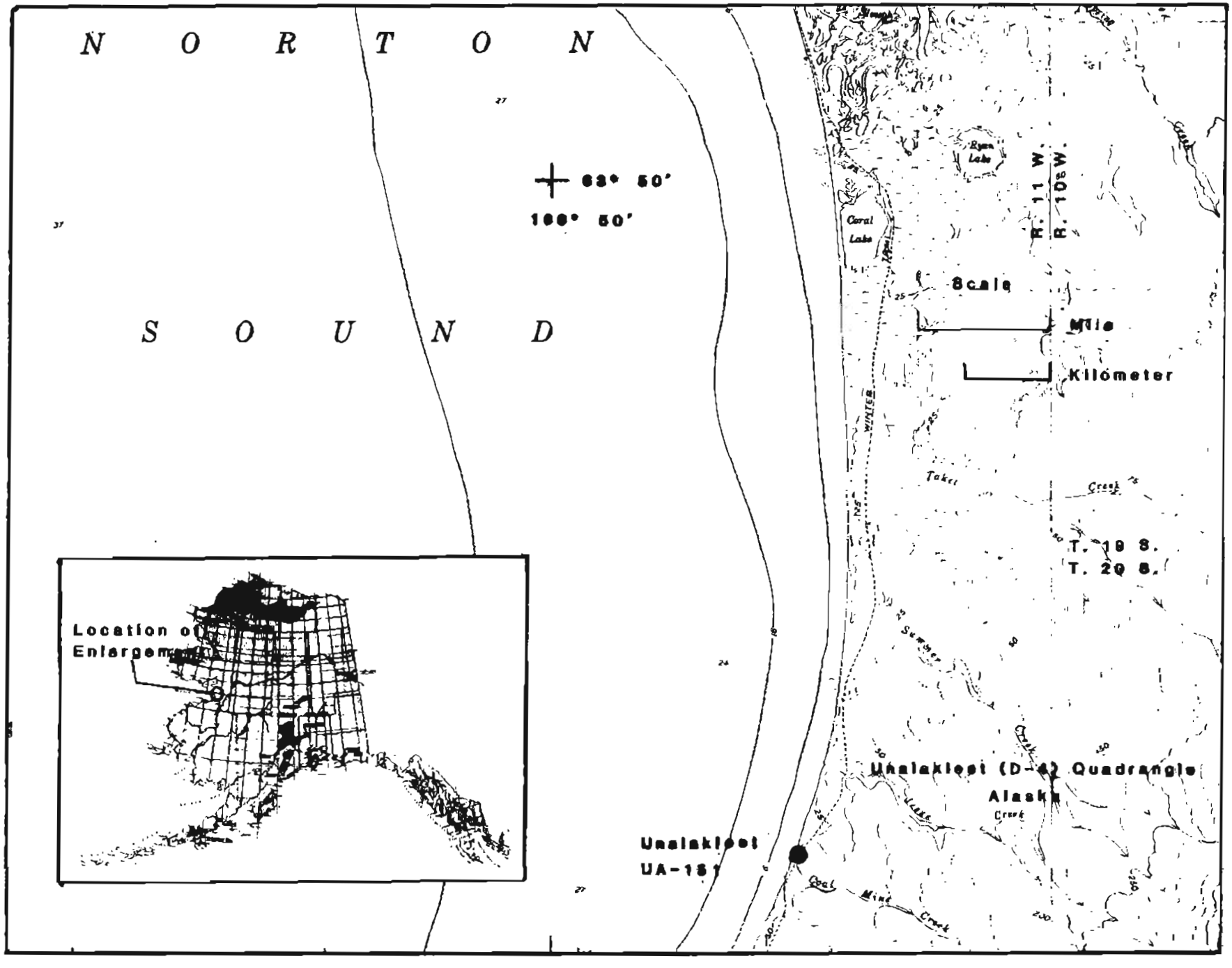


Figure 23. Location of sampling site at Unalakleet coal occurrence.

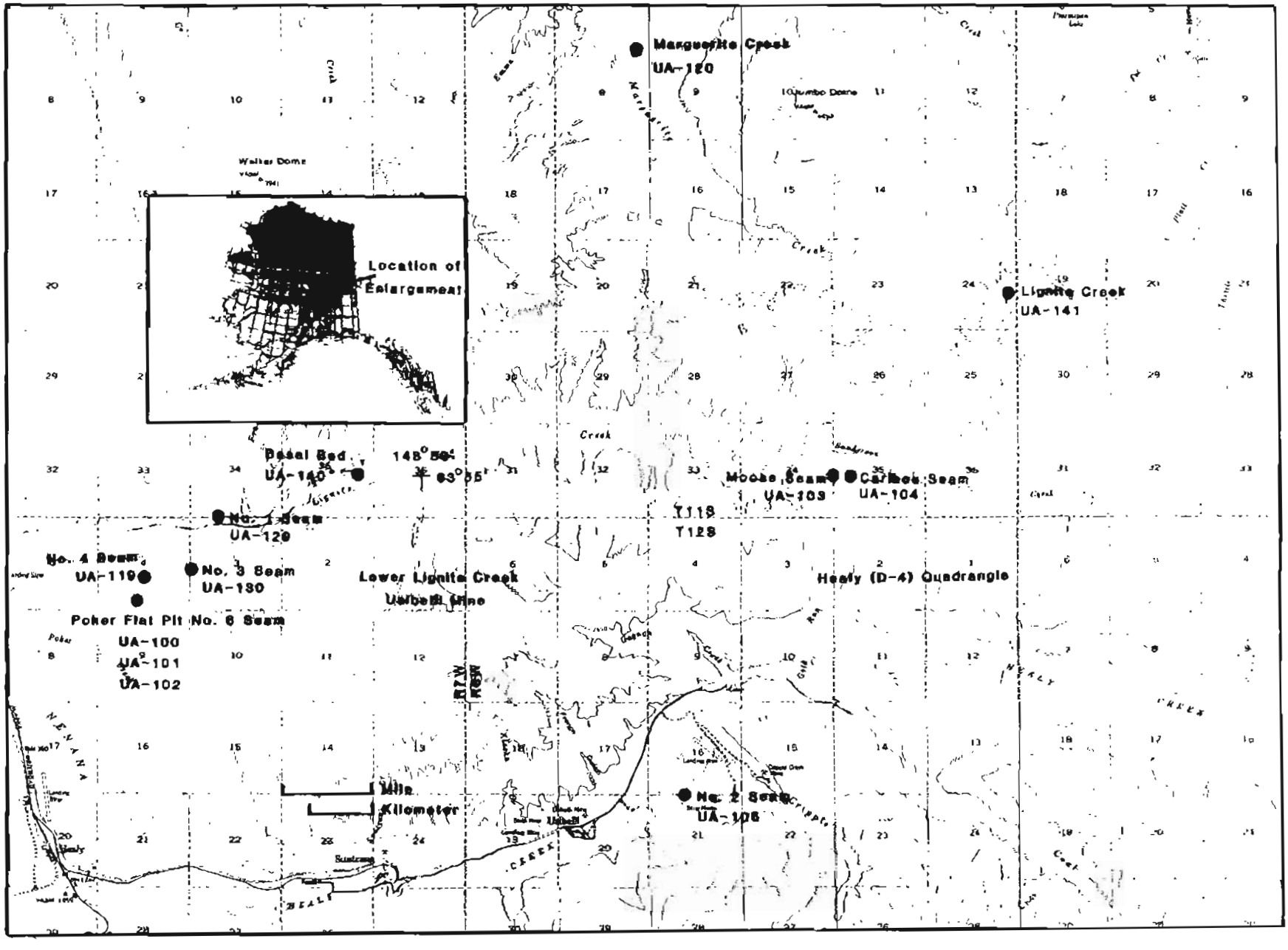


Figure 24. Location of sampling sites in the Nenana field.

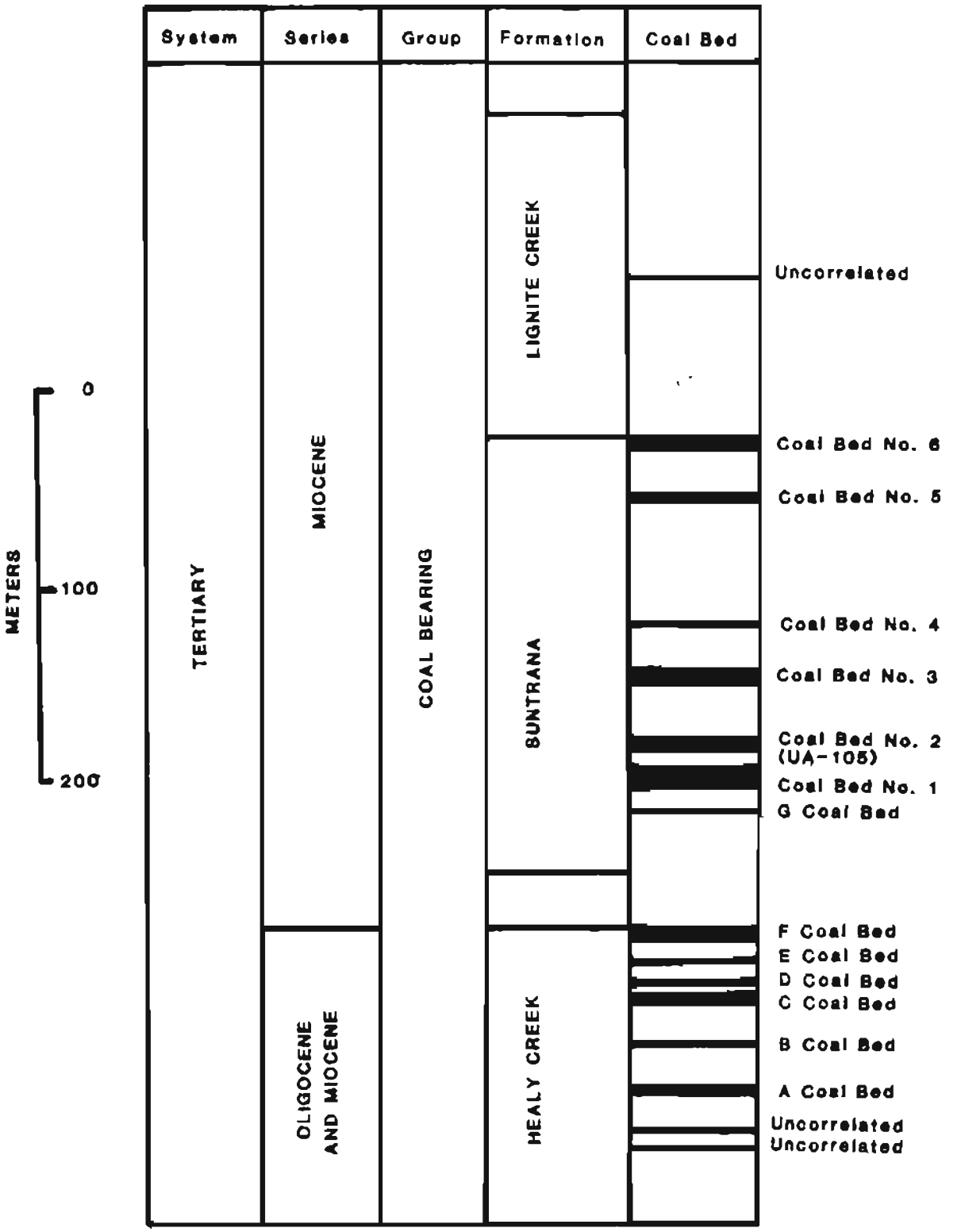


Figure 25. Geological column showing mineable coal beds on Suntrana and Healy Creeks, Nenana coal field.

Figure 26. A general view of coal exposures on Upper Lignite Creek. UA-141 was sampled from the seam marked with an arrow.

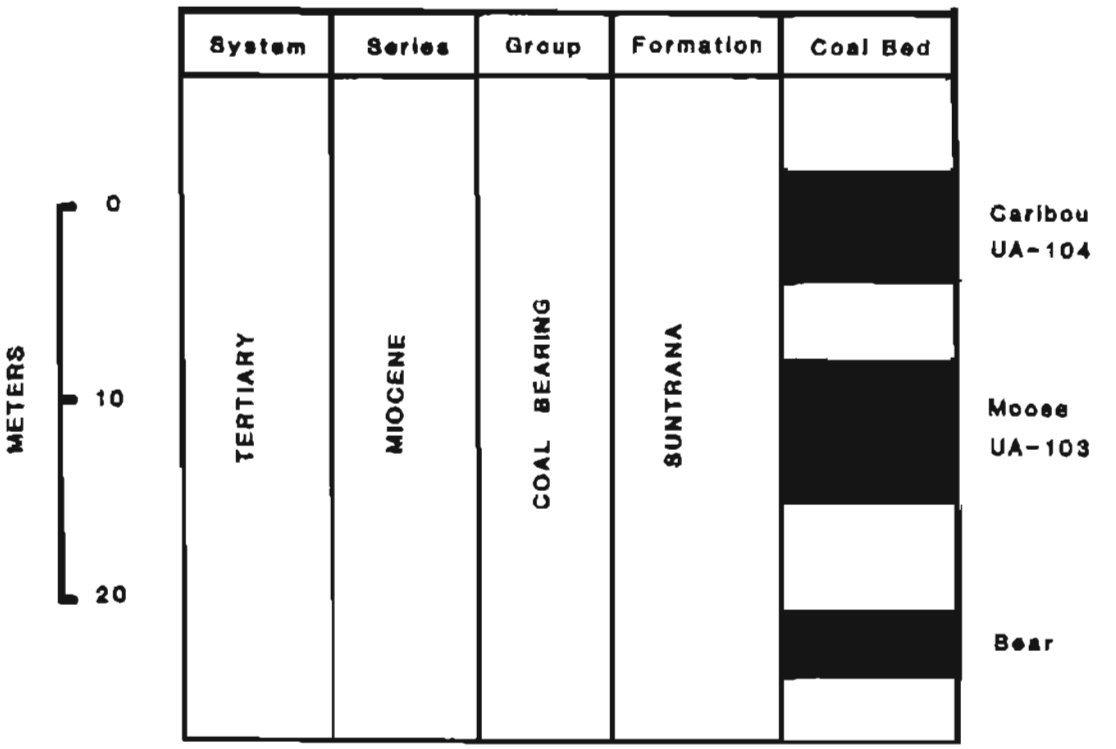


Figure 27. Geological column showing coal beds on the Upper Lignite Creek, Nenana coal field.

beds are restricted to Suntrana formation. The bulk of the coal resources are contained in seams six (21 feet) (UA-100, 101, 102), four (21 feet) (UA-119, Figure 28), and three (17 feet) (UA-130). No. 2. seam (UA-129) is of poor quality and No. 1 seam has clay and bone parting (Denton, 1980).

Figure 29 is a generalized geological column showing coal beds exposed at Lower Lignite Creek Poker Flat pit of the Usibelli Coal Mine. The south side of Lower Lignite Creek is the location of current mining activity. Sample UA-140 was collected from the north side of Lignite Creek from what is designated by Wahrhaftig (1951) as the Basal bed. It is stratigraphically below No. 1 seam and has not been correlated with other seams in the field. The Basal bed was formerly mined by the Arctic Coal Company. At the sampling location, the seam was 60 feet thick. Wahrhaftig (1951) estimates reserves for the bed at the sampling site to be 0.25 million tons. The full extent of the Basal bed is not known. Sample UA-141 was collected from Upper Lignite Creek (Figure 30) from a seam occurring in the Suntrana formation, correlation to other seams on Lower Lignite Creek has not been established. Sample UA-120 is from a 30.5 feet thick seam outcropping on a bluff (Figure 31) along Marguerite Creek west of Jumbo Dome. Although this seam occurs in the Suntrana formation, correlation to other seams along Lignite Creek has not been established. Sample No. UA-132 was collected from the Yanert mine (Figure 32). This seam has not been correlated with other seams in the Nenana field.

Jarvis Creek

The Jarvis Creek coal field is located about 125 miles southeast of Fairbanks on the north side of the Alaska Range (Figure 33). The coal field is 16 square miles in area and the site

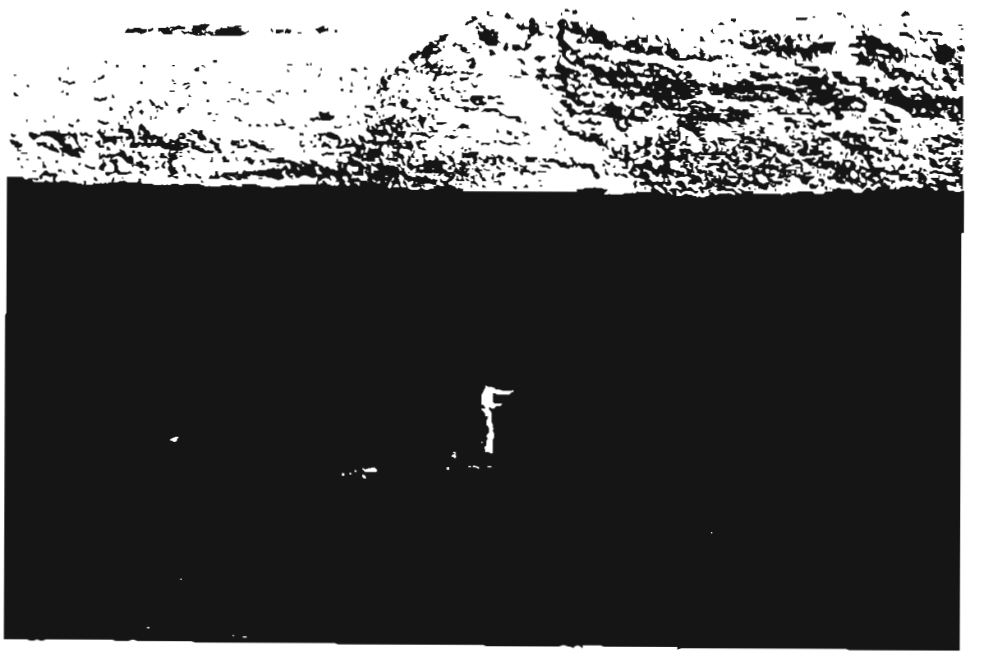


Figure 28. A mine face of No. 4 Seam.

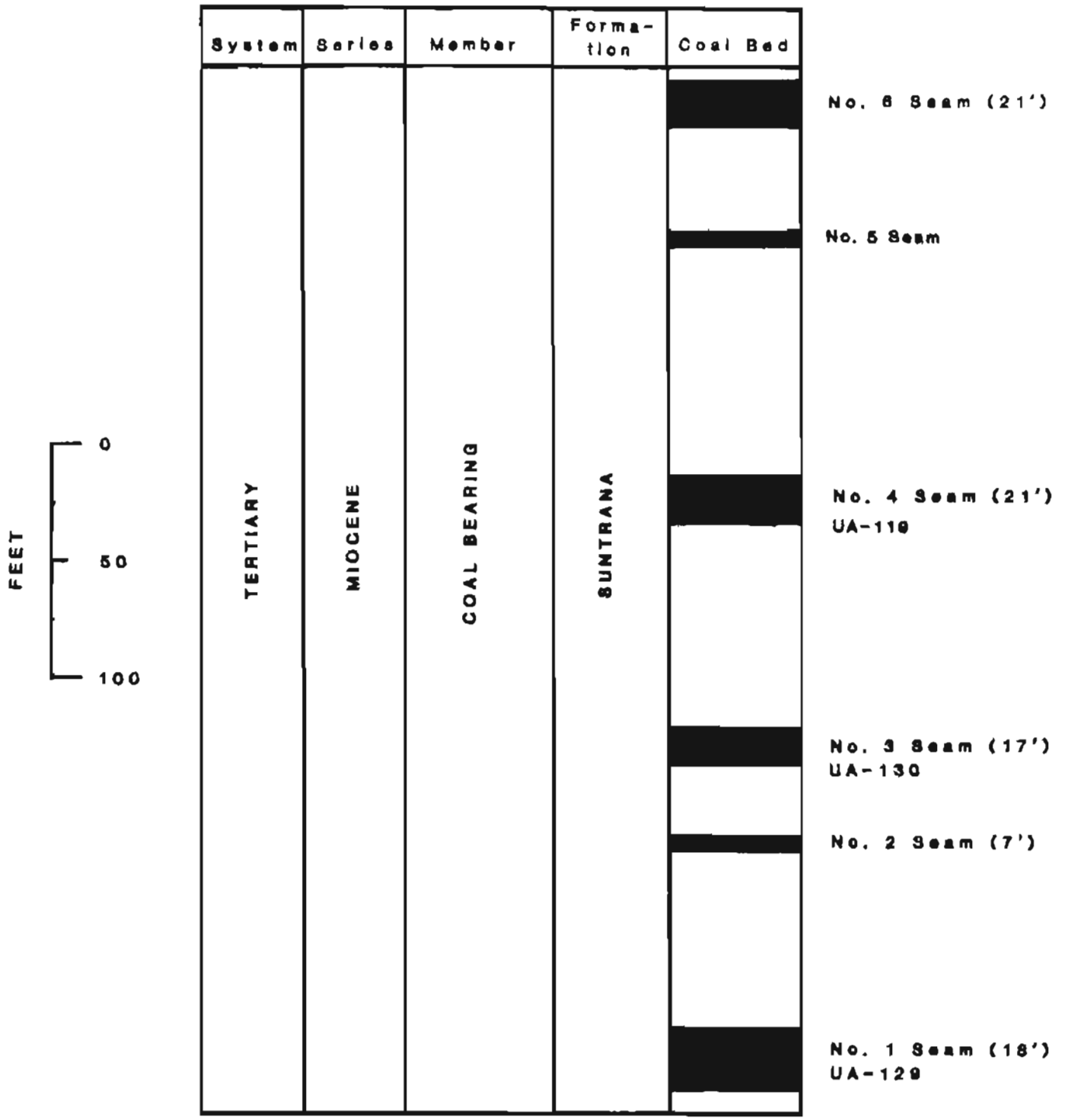


Figure 29. Geological column showing mineable coal beds at the Poker Flat Pit, Usibelli coal mine, Nenana coal field.

Figure 30. Outcrop of Basal Bed on Lignite Creek.

Figure 31. Outcrop of coal on Marguerite Creek. The outcrop faces Jumbo Dome, Nenana coal field.

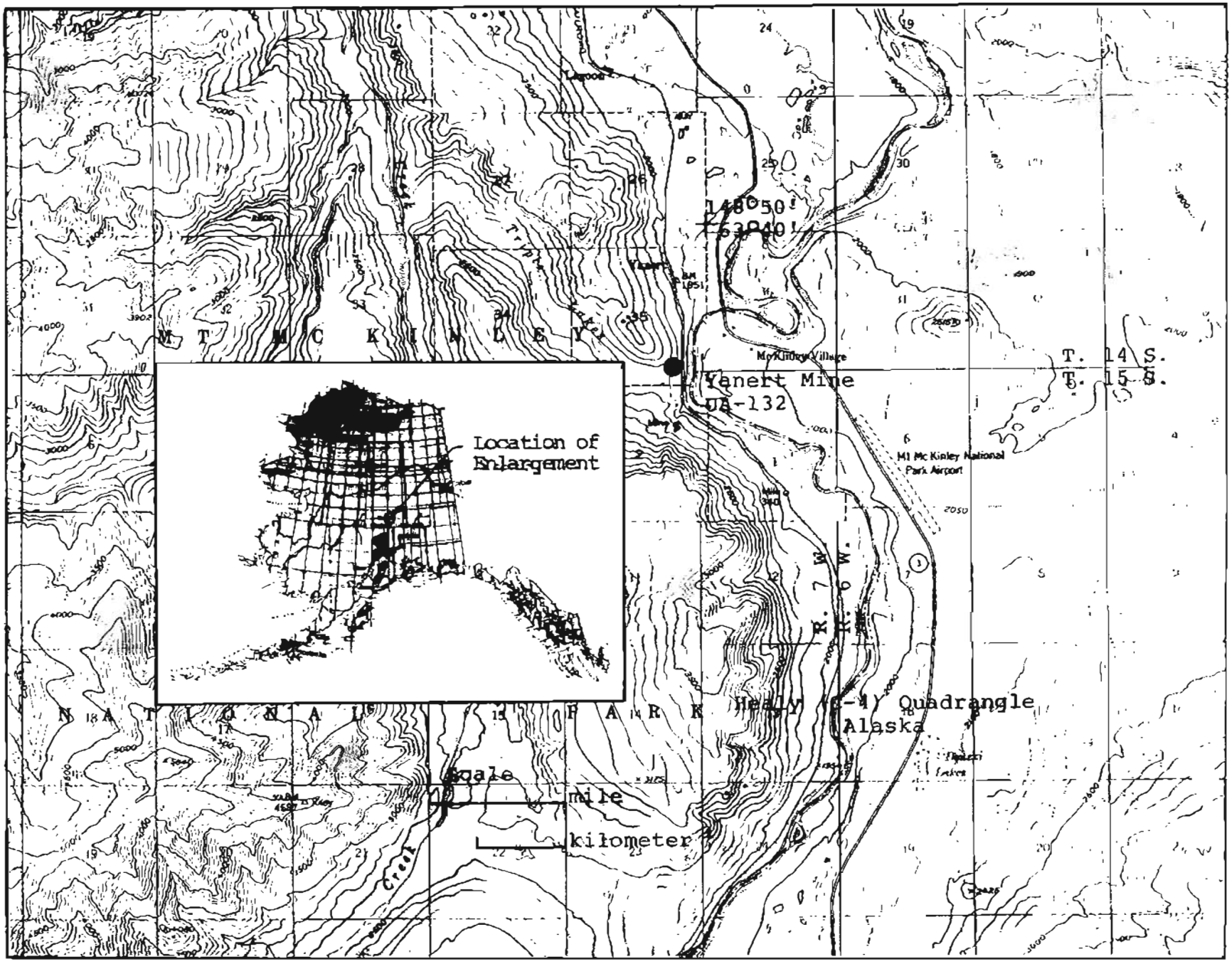


Figure 32. Location of sampling site at the Yanert mine, Nenana coal field.

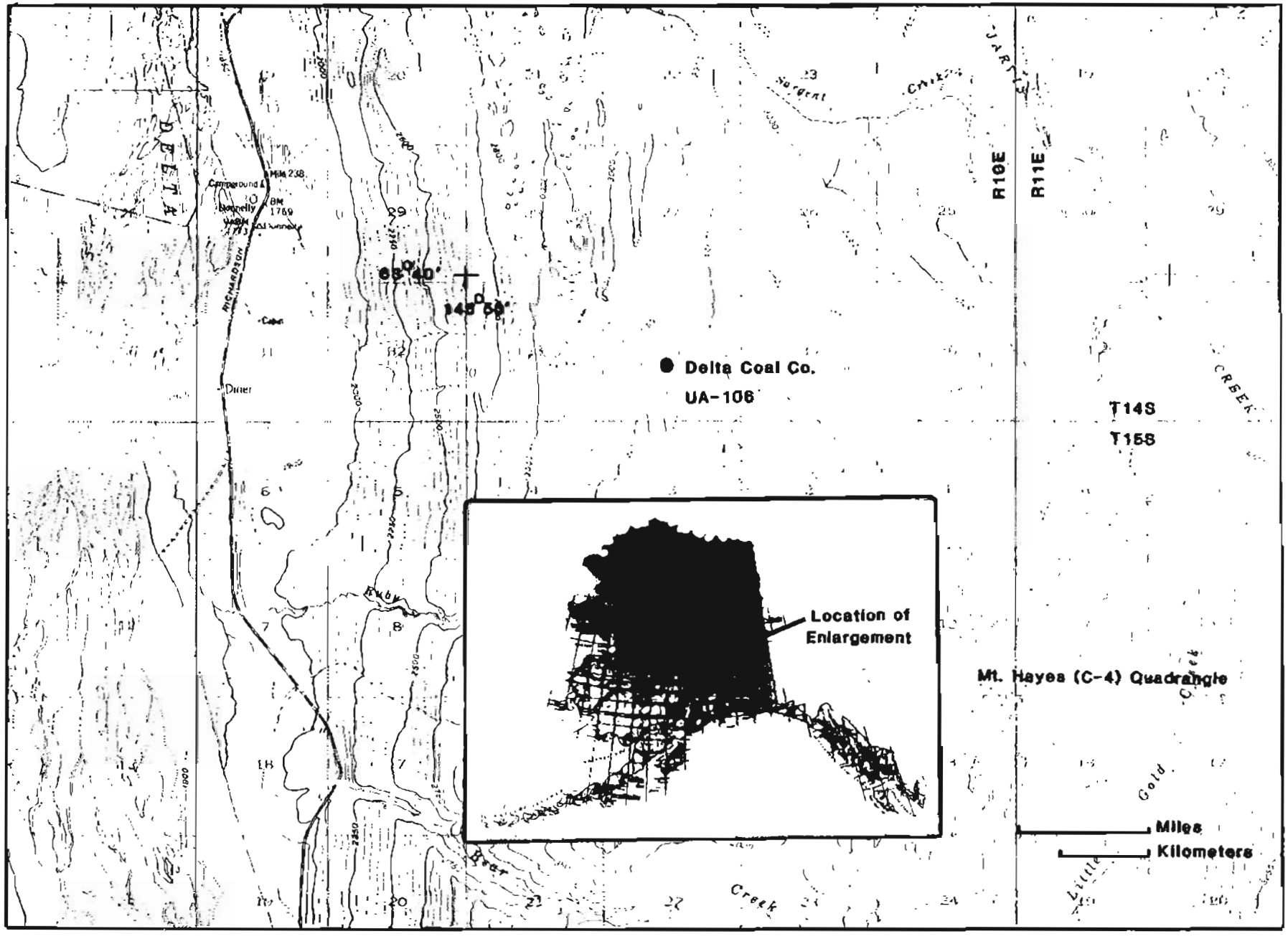


Figure 33. Location of sampling site in the Jarvis Creek coal field.

of sporadic mining activity. It is about 6 miles via a pioneer gravel road from the Richardson Highway, Mile 242. The coal field has been mapped by Wahrhaftig and Hickcox (1955). It is Tertiary in age and has been correlated to the Healy Creek formation of the Nenana coal field, 100 miles to the west.

The coal bearing formation consists of a sequence of interbedded lenses of poorly consolidated sandstone, siltstone, claystone, and conglomerate. Although there are numerous coal beds, those with thicknesses exceeding 2-1/2 feet are rare with the exception of nine seams sampled.

Drilling by Warfield (1973) indicated depositional continuity over a fairly long distance. The seam that was sampled (UA-106), designated Mine Seam, has been intersected by three drill holes at 62 feet, 34.6 feet, and 20 feet below the surface (Warfield, 1973). This seam has not been correlated with the seams measured by Wahrhaftig. From the drill data, it is conservatively estimated that the Mine Seam has a strip mining potential of 375,000 tons (Warfield, 1973). Additional geological and drill data are needed to assess the potential of the coal field and to correlate Mine Seam with seams exposed in other parts of the coal field.

Eagle

Coal bearing rocks of probable early Tertiary age underlie a two to ten mile wide belt along the Yukon River from the Canadian border northwestward for about 80 miles (Brabb and Churkin, 1964). Coal crops out at numerous localities in the region. One seam was sampled at Coal Creek (UA-121, Figure 34). Another seam was sampled at Chicken (UA-124), which is about 50 miles south of Eagle-Circle district proper (Figure 35). Both seams are uncorrelated. The seam is described by Mertie (1930) as being 22 feet thick and was opened by a 35 ft. shaft. The mine was caved in and abandoned when Barnes (1967a) visited in 1956. For the washability program, 5.5 feet of the seam was uncovered and sampled. The rest of the seam was sloughed in and was inaccessible for sampling. The coal bearing rocks at Chicken probably underlie only a few square miles. They have been assigned a Tertiary age on the basis of lithology (Barnes, 1967a).

Nulato

Collier was the first to make a systematic study of the coal occurrences along the Yukon River (1903), which were subsequently reviewed by Martin (1926), Smith and Eakin (1910) and Chapman (1963). Coal has been mined or identified at several localities along the Yukon River between Ruby and Anvik. Coal is found in the upper unit of the interior facies, which is nonmarine and is equivalent to the Kaltag formation of Martin (1926).

The Pickart mine, one of the earliest mines on the Yukon River, was started by the Pickart Brothers in 1898. It was abandoned in 1902 after the gangway had been extended about 600 feet on account of "rolls" in the floor which cut off the coal. In 1944 Chapman could find neither the coal bed nor evidence of the mine. The author of this paper too was unsuccessful in finding any remains of the Pickart mine. However, in the general vicinity, a 12 inch thick coal seam was located on the cliff. This uncorrelated seam was variable in thickness and pinched out laterally. This seam was sampled to provide an indication of quality and rank of the coal (UA-128, Figure 36). Additional geological investigations are needed beyond the river bluffs, although the thick vegetation cover and lack of outcrops makes geological exploration expensive.

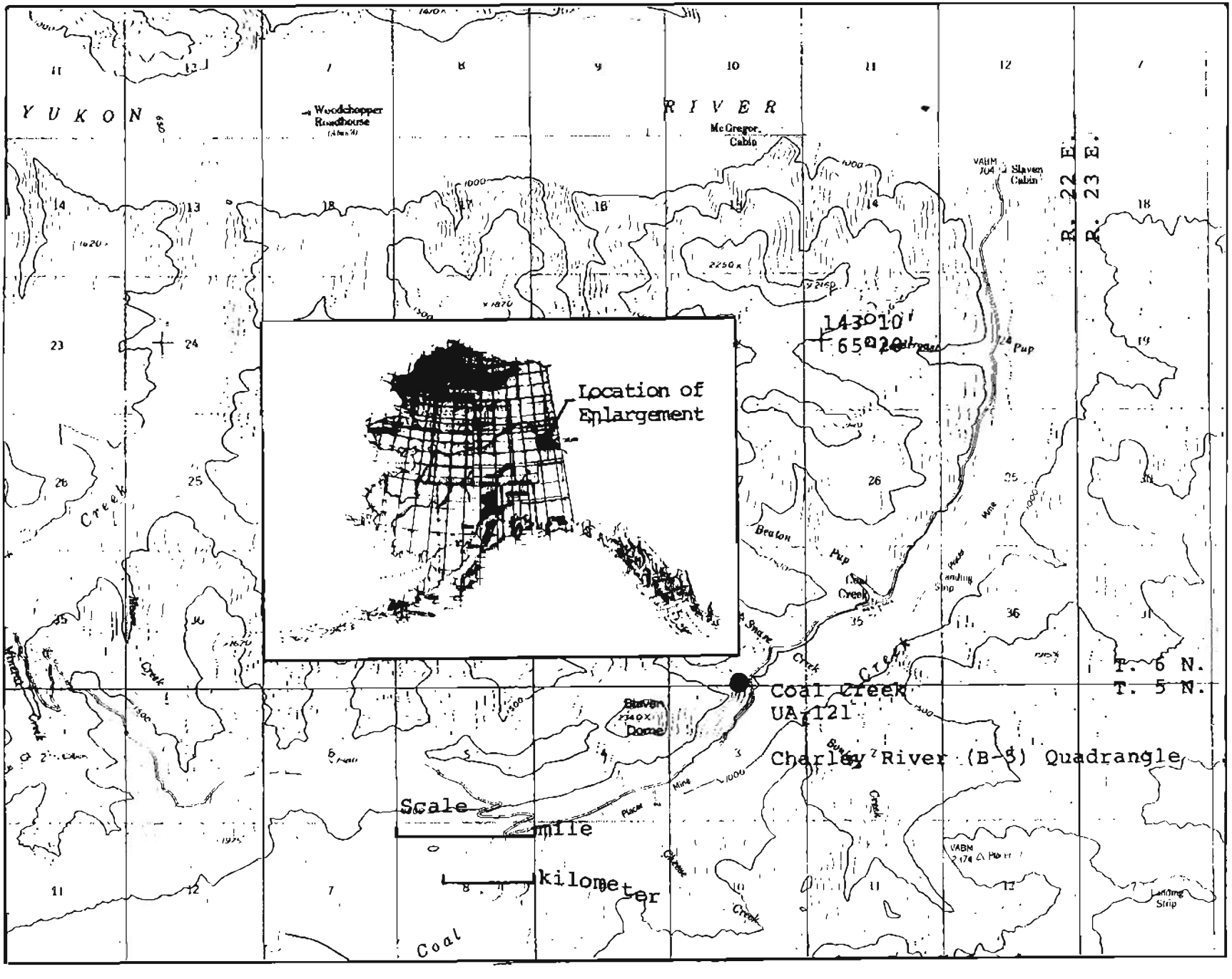


Figure 34. Location of sampling site on Coal Creek in the Eagle coal field.

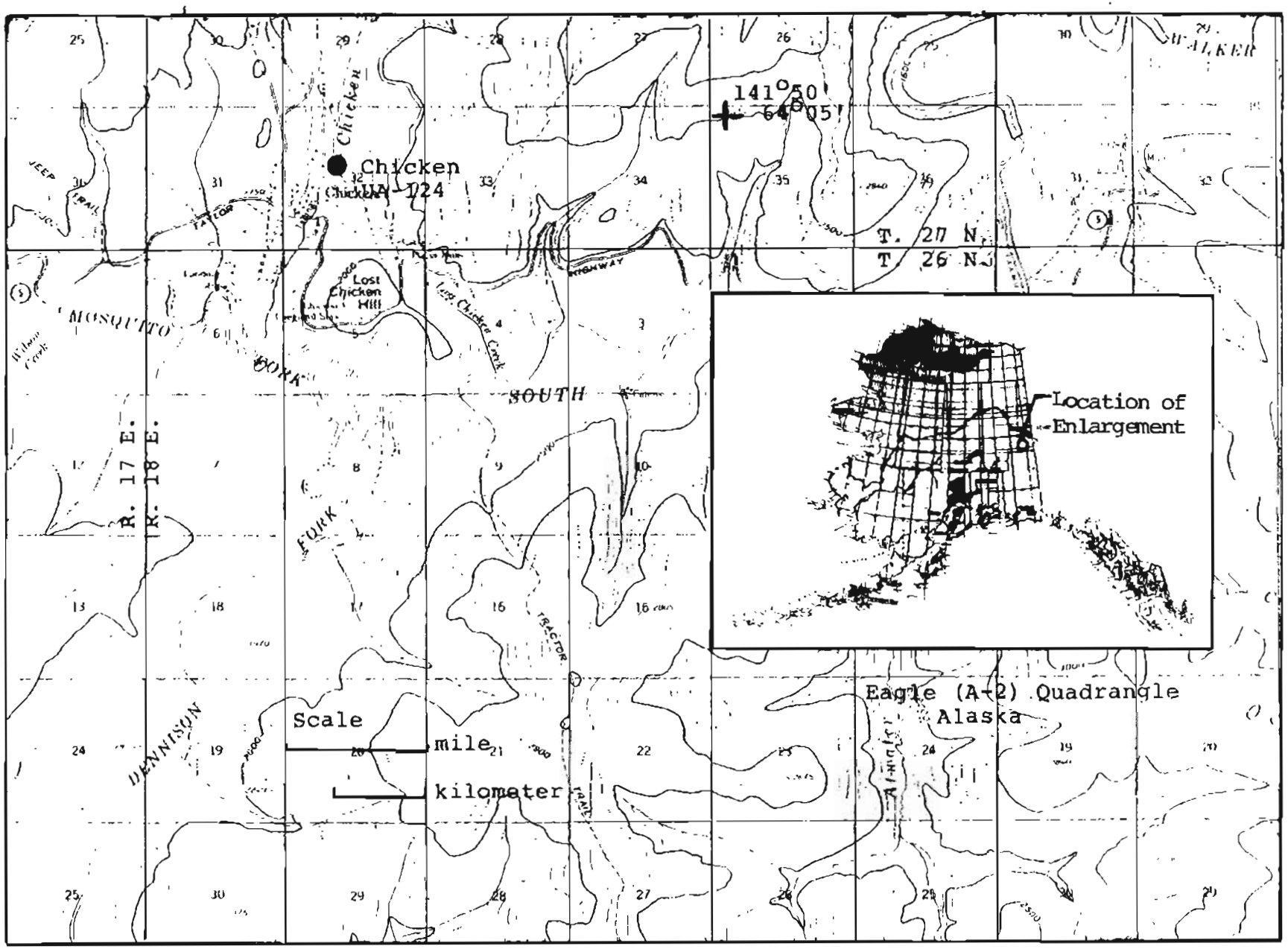


Figure 35. Location of sampling site near Chicken, in the Forty Mile district, Eagle coal field.

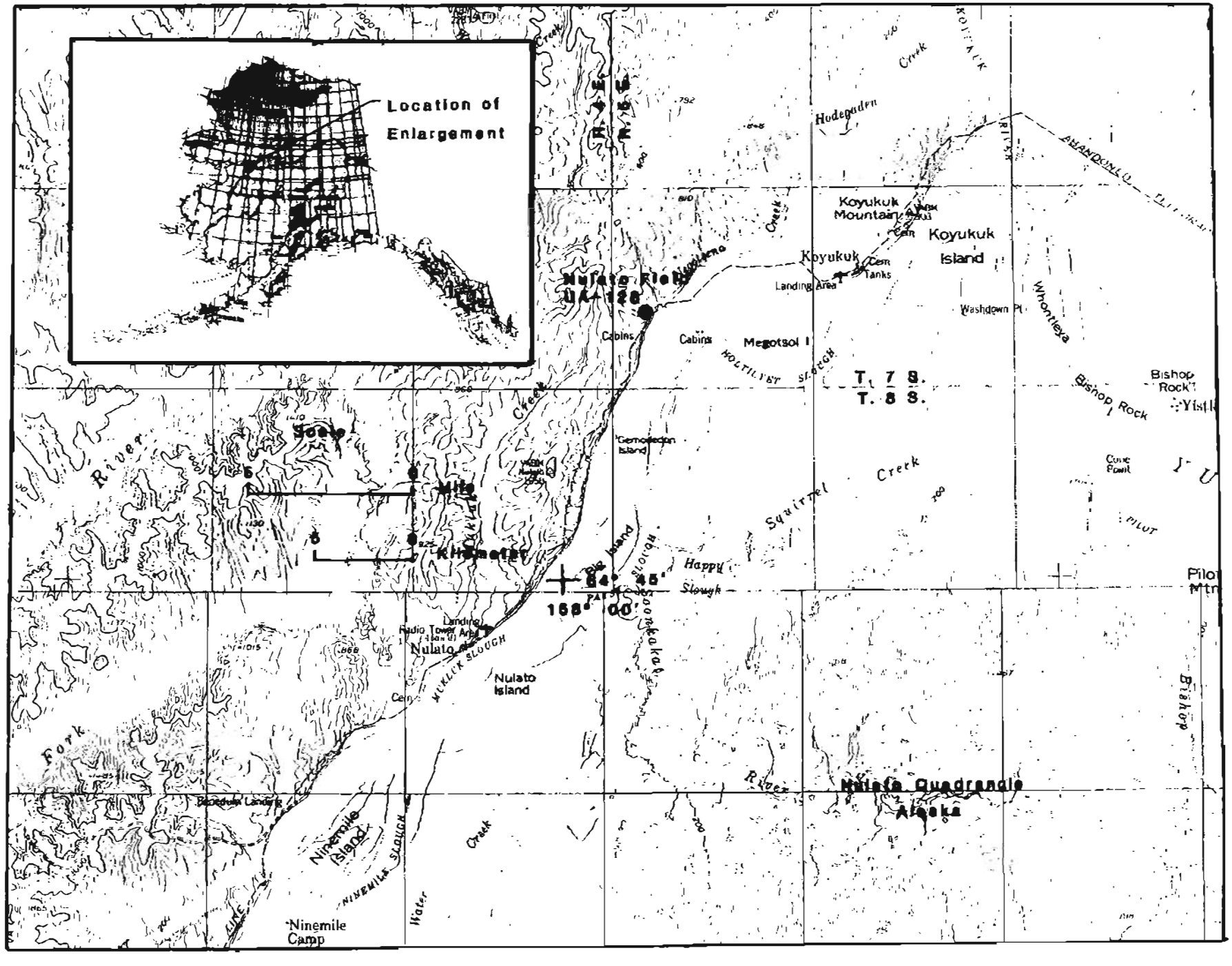


Figure 36. Location of sampling site at the Nulato field.

Tramway Bar

Occurrence of coal near Tramway Bar was first reported by Schrader (1900) in 1899 and has been mined for local use (Smith and Mertie, 1930). The occurrences are at the northeastern part of the Yukon-Koyukuk Province. The province is a broad tract of Cretaceous and Tertiary rocks that stretches across west-central and southcentral Alaska from the Brooks range to the Yukon River delta (Patton, 1973). Tramway Bar occurrence is the western most outcrop of coal in the basin, and is assigned an Upper Cretaceous age (Patton, 1973).

Coal is exposed along the north bank of the Koyukuk River (Figure 37) in three uncorrelated beds - a three foot, an eight inch, and a 17 foot six inch bed. The top portion of the 17 foot bed was covered and was difficult to sample. The bottom 13 feet of this uncorrelated coal bed (UA-117) was sampled including bands of interbedded shale. The coal bed dips at 56° and the sample was cut horizontally across the seam (Figure 38) at a level of 6 feet above the river.

SOUTHCENTRAL ALASKA FIELDS

Nonmarine sedimentary rocks of Cook Inlet basin exceed 18,000 feet in thickness, and in some parts of the basin they may extend to 27,000 feet. The rocks outcrop as far north as Peters Hills and continue south to Homer, forming a belt 200 miles long and 70 miles wide. Although these formations were known to be coal bearing since the early 1900's, recent discoveries of petroleum and gas sparked intensive drilling that resulted in a greater understanding of the geology of these Tertiary rocks.

Figure 39 shows stratigraphic nomenclature as proposed by Calderwood and Fackler (1972), and modified and updated by Magoon et al. (1976). It will be noted that coal seams of possible commercial value are restricted to the Tyonek and Beluga Formations. Figure 39 also shows approximate updated stages of Seldovian, Homerian and Clamgulchian stages identified by Wolf et al. (1966) from paleobotanical and palynological evidence along with age determinations. From purely geographical considerations, the sedimentary basin is divided into three coal fields: Kenai, Beluga and Yentna.

The coal is of Tertiary age and is limited to the Kenai group (formerly Kenai formation). Coal is interbedded with coarse to fine grained sandstones, siltstones and occasional conglomerates. The Kenai Group is subdivided into four formations which include the Hemlock conglomerate, Tyonek, Beluga and Sterling formations.

Beluga

Barnes (1966) defined Beluga-Yentna region as the broad lowland west of lower Susitna River that is bounded on the north and west by the Alaska Range and on the south by Upper Cook Inlet and the Chakachatna River. The Beluga coal field is part of Cook Inlet sedimentary basin and is located approximately 60 miles west of Anchorage on the northwest shore of Cook Inlet. The field can be subdivided into three coal bearing regions. The Three Mile Creek Basin, located about six miles from Cook Inlet, contains approximately 22 steeply dipping seams averaging 10 feet in thickness.

The Capps Basin lies 26 miles from Cook Inlet. This area has two beds in the Tyonek formation (Figure 40), the Upper Capps bed (UA-127) with an average thickness of 17 feet, and the Waterfall bed (Capps bed of Barnes) with an aggregate thickness from 20-49 feet (Figure 41, 42). The latter has an average mineable thickness of 30 feet with interburden

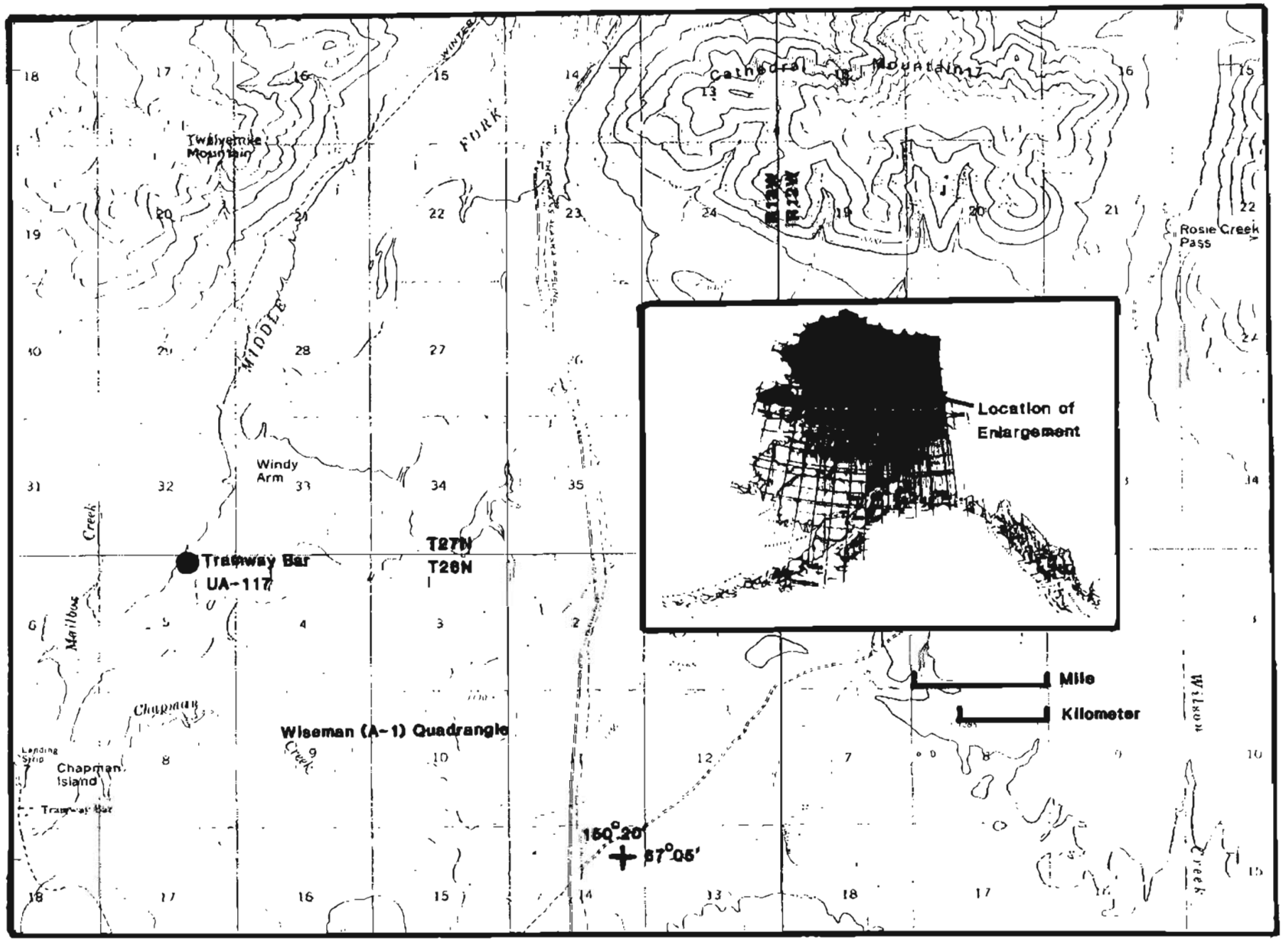


Figure 37. Sampling location of Tramway Bar field.

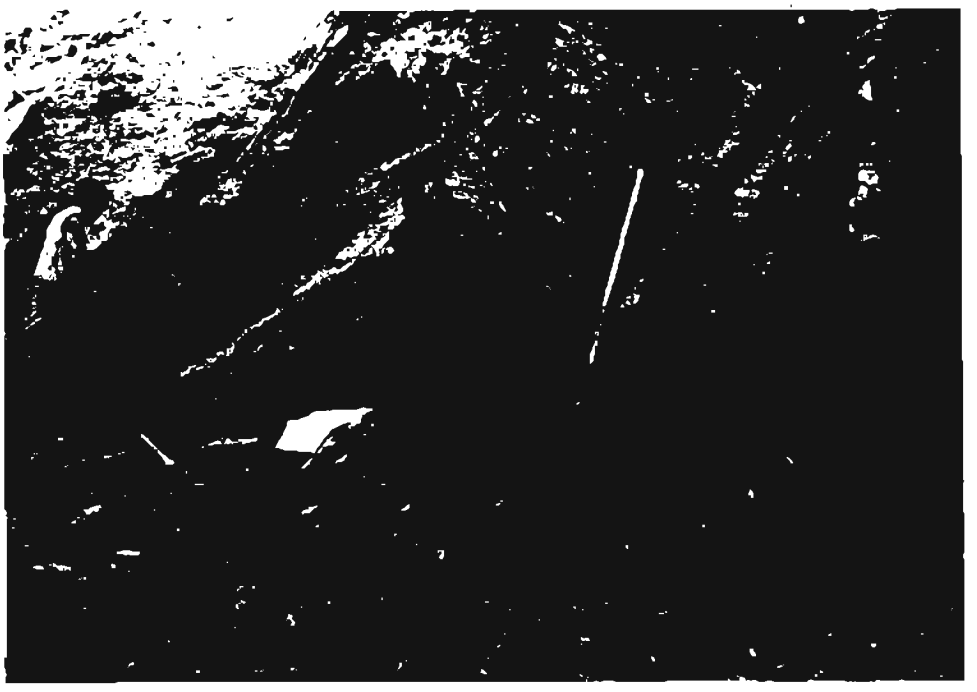


Figure 38. A closeup view of outcrop in Tramway Bar field.

varying from 80 to 280 feet (Laird, 1978). Sample No. UA-113 was collected from the Waterfall bed, and represents the bottom 30 feet of the bed. The top 6 feet is dirtier, with a one foot band of clay in the middle, and was therefore sampled separately (UA-148). Figure 43 shows the two portions of the seam, excavated in two benches.

The Chuitna River basin lies approximately 50 miles west of Anchorage. There are five major coal seams as follows: Brown seam (Chuitna bed of Barnes) 28 feet; Yellow seam, 5 to 15 feet; Green seam, 20 feet; Blue seam, 28 feet; Yellow seam, 5 feet and red seam 33 feet thick (Ramsey, 1980). Diamond Alaska Coal Co. (with Bass-Hunt-Wilson) and Placer Amex, Inc. are the principal lease holders in the basin. Reserves within the Diamond-Alaska Coal Co. lease holdings are estimated at 350 million tons at a cumulative stripping ratio of 4.4.

UA-152 is a sample of the Green seam from a pit dug by Placer Amex, Inc., (Figures 44, 45) in their lease holdings for mining and shipment of a 2000 ton bulk sample to Japan for testing. Figure 46 is a geological column of coal beds known to occur at the pit site from drilling records.

Beluga Coal Company, a subsidiary of Placer Amex, holds State of Alaska coal leases in all three basins for a total area of 400 square miles. Barnes estimates the indicated reserves in the 400 square mile area south of Beluga Lake at 200 million tons.

The following is an estimate by Beluga Coal Company of mineable reserves in their leased area (Laird, 1978). Three Mile Basin has an estimated 60 million tons in the 22 steeply

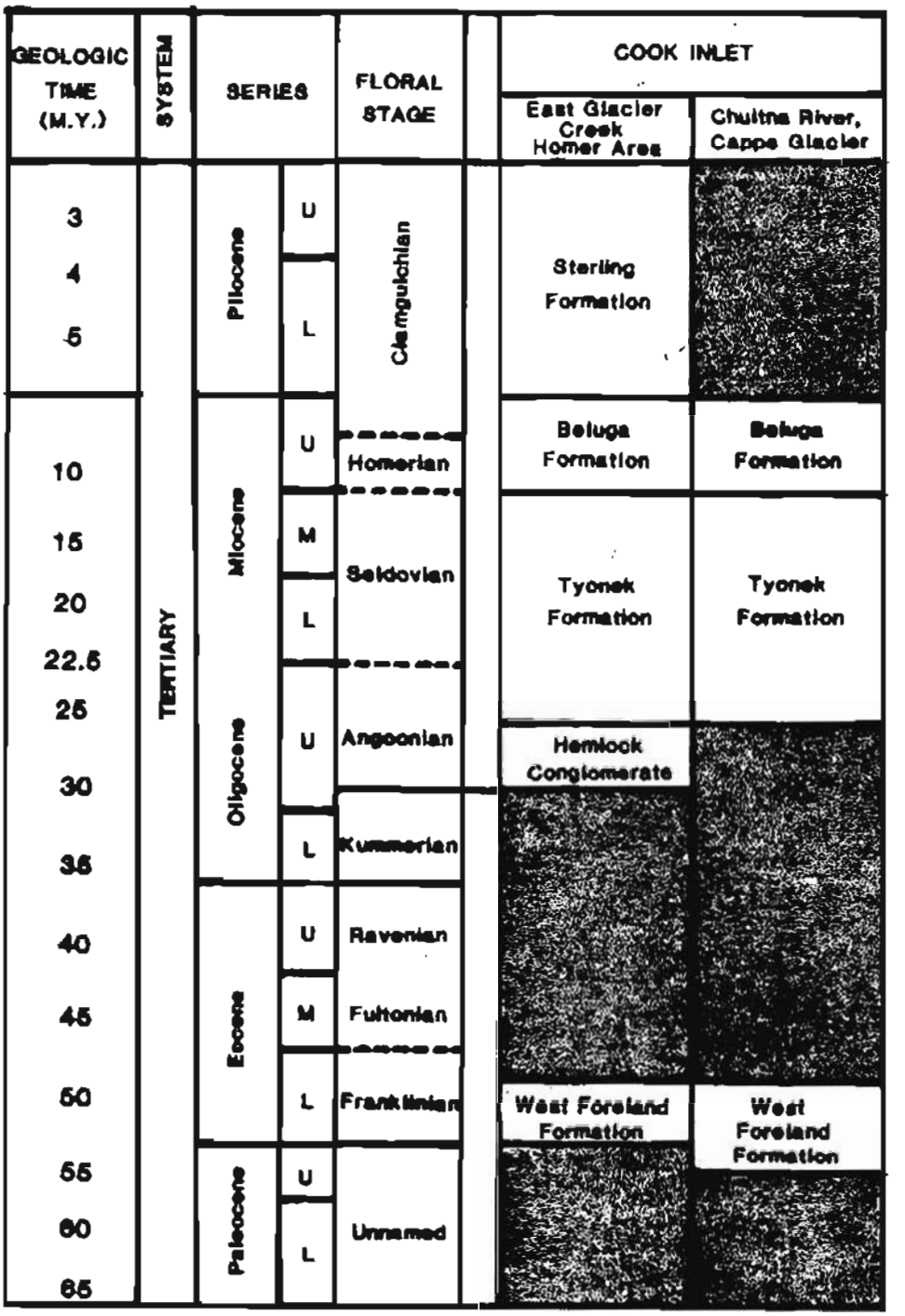


Figure 39. Correlation of Tertiary rocks in the Beluga coal field. (Source: Magoon, Adkison and Egbert, 1976).

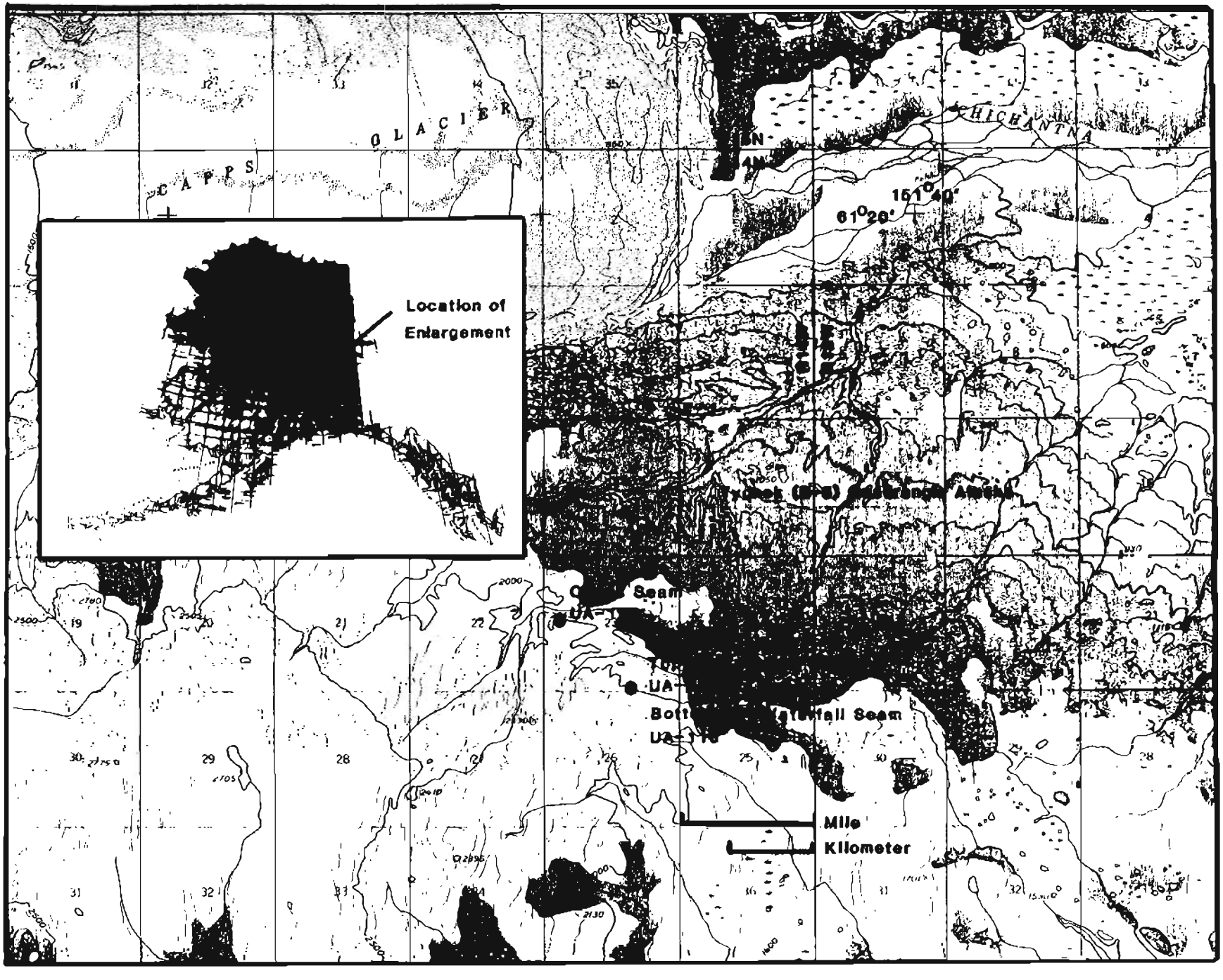


Figure 40. Location of sampling sites in the Capps Basin of the Beluga coal field.

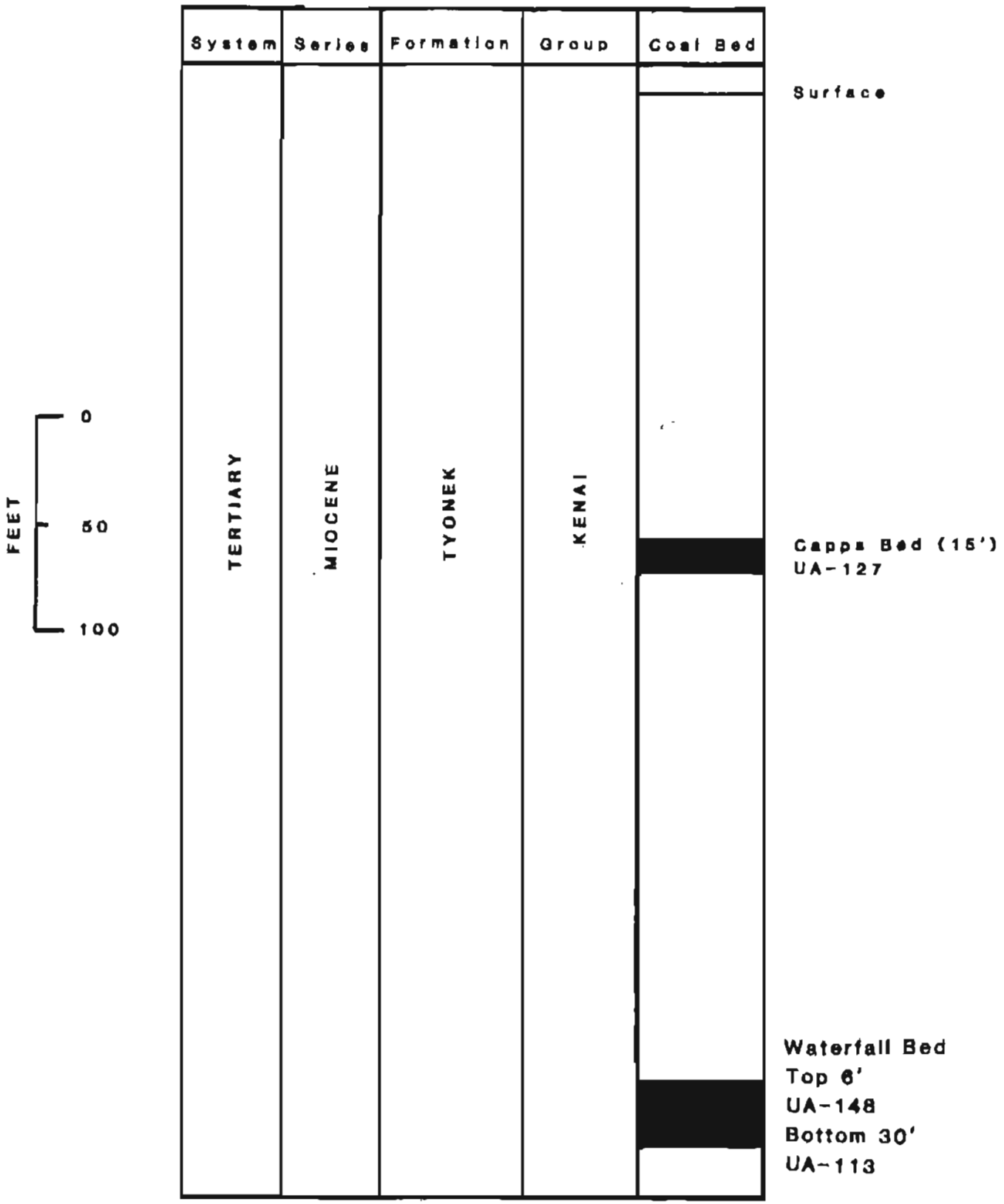


Figure 41. Geological column showing mineable coal beds in the Capps basin, Beluga coal field.

CAPPS AREA

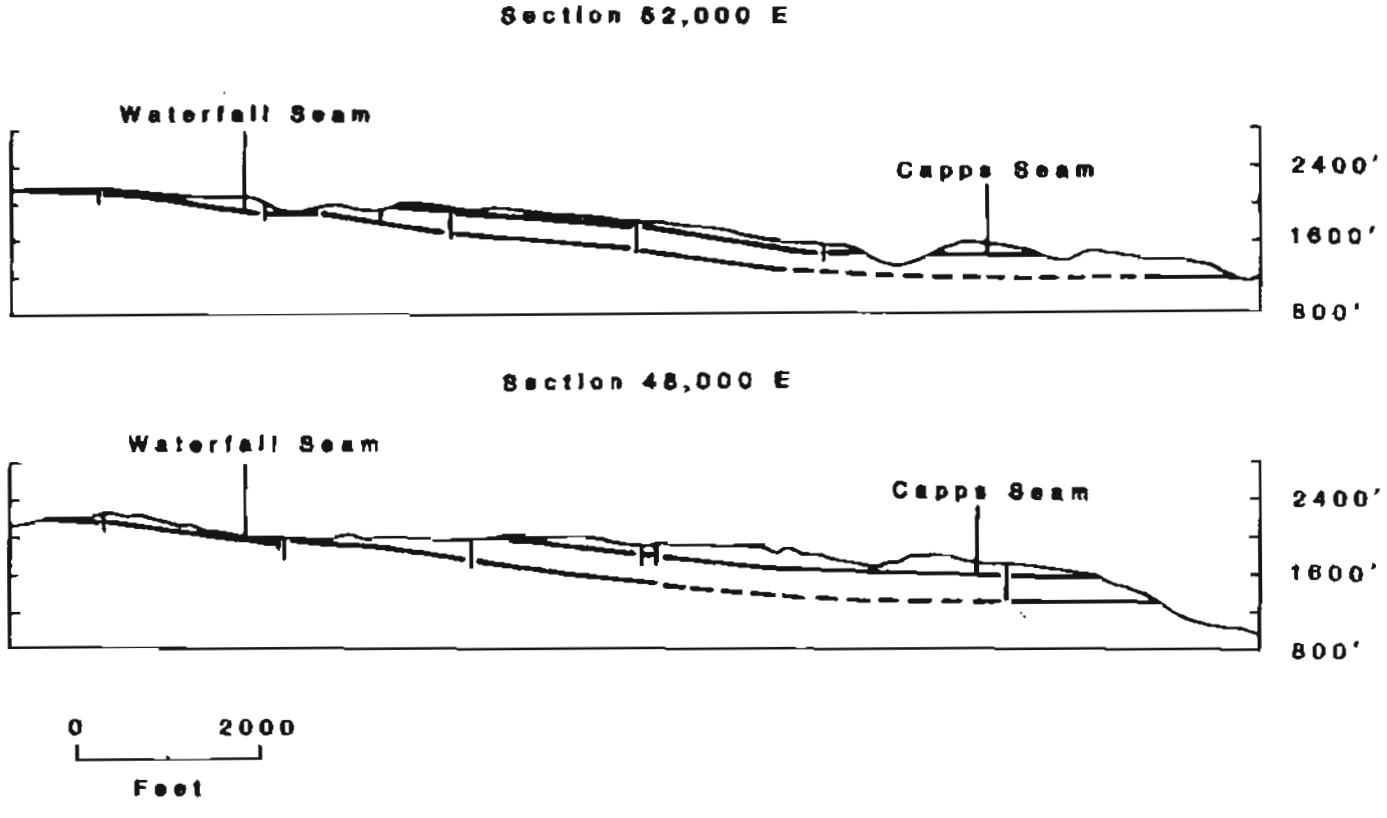


Figure 42. Capps coal field - cross section.

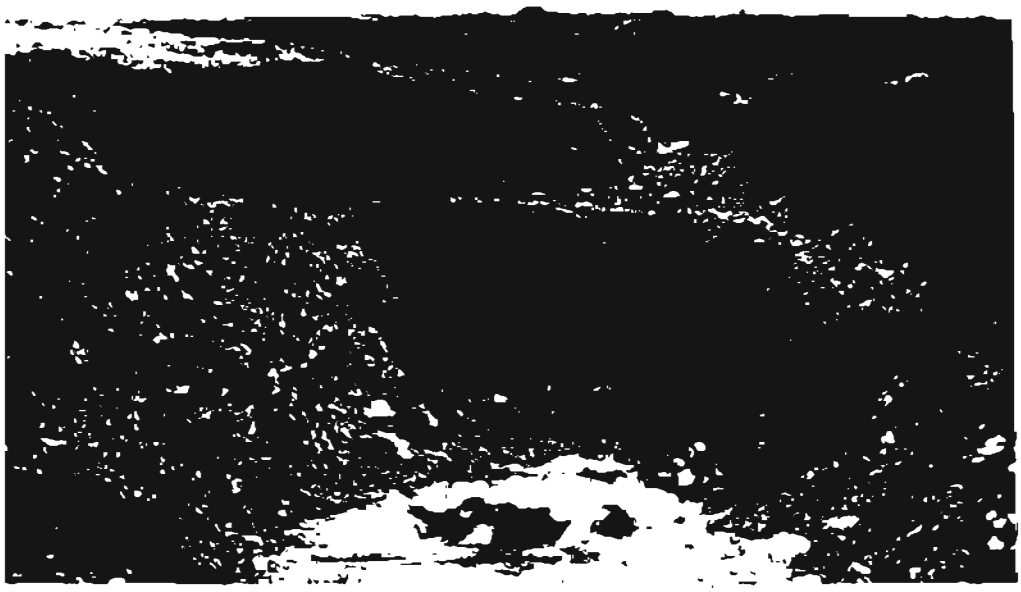


Figure 43. A subcrop of the Waterfall seam opened up in benches by Placer Amex for bulk sampling. The lower 30 foot bench and the upper 6 foot bench are distinguishable.

dipping beds averaging 10 feet thick at a stripping ratio of 9 to 1. Chuitna Basin has approximately 200 million tons of near surface reserves on the west side of the river. In the Capps Basin the reserves of the Capps and Waterfall beds are estimated at 200 million tons at a stripping ratio of 5 to 1.

The lower part of the Tyonek Formation is well exposed south of the Capps Glacier, and the section is described by Adkison et al. (1975). The location is about two miles north of the sample location of UA-113. These beds were designated part of the type section of the Seldovian stage by Wolff, et al. (1966).

Yentna

The coal seams in this region are confined to the Kenai formation which lies unconformably over a series of metamorphic and igneous rocks of early Jurassic to date Cretaceous age. Unconsolidated Quaternary deposits of glacial till, outwash materials, alluvial sands and gravels cover much of the coal bearing Kenai formation and make it impossible to correlate outcrops. Mobil Oil Corp. holds leases in the Johnson and Canyon Creek area and did drilling in 1975, 1977, and 1979. Although there are only three seams outcropping along Johnson Creek, drill data indicate the presence of five to seven seams ranging in thickness from 10 to 40 feet (Blumer, 1980). The seam sampled (UA-149), Figures 47, 48 and 49, is from locality 15 of Barnes (1966) and is apparently the same seam penetrated by drill hole ALJ-77-6 (Blumer, 1980, p. 123, Figure 1) approximately 2 1/2 miles south of the outcrop. The coal bed sampled on Canyon Creek UA-150 (Figures 50, 51) is the same as location 24 of Barnes. The top of the seam appeared to be an erosional surface at the outcrop. The sampled seam represents the top seam of drill hole AL-7503 of Blumer (1980), (p. 123, Figure 1).

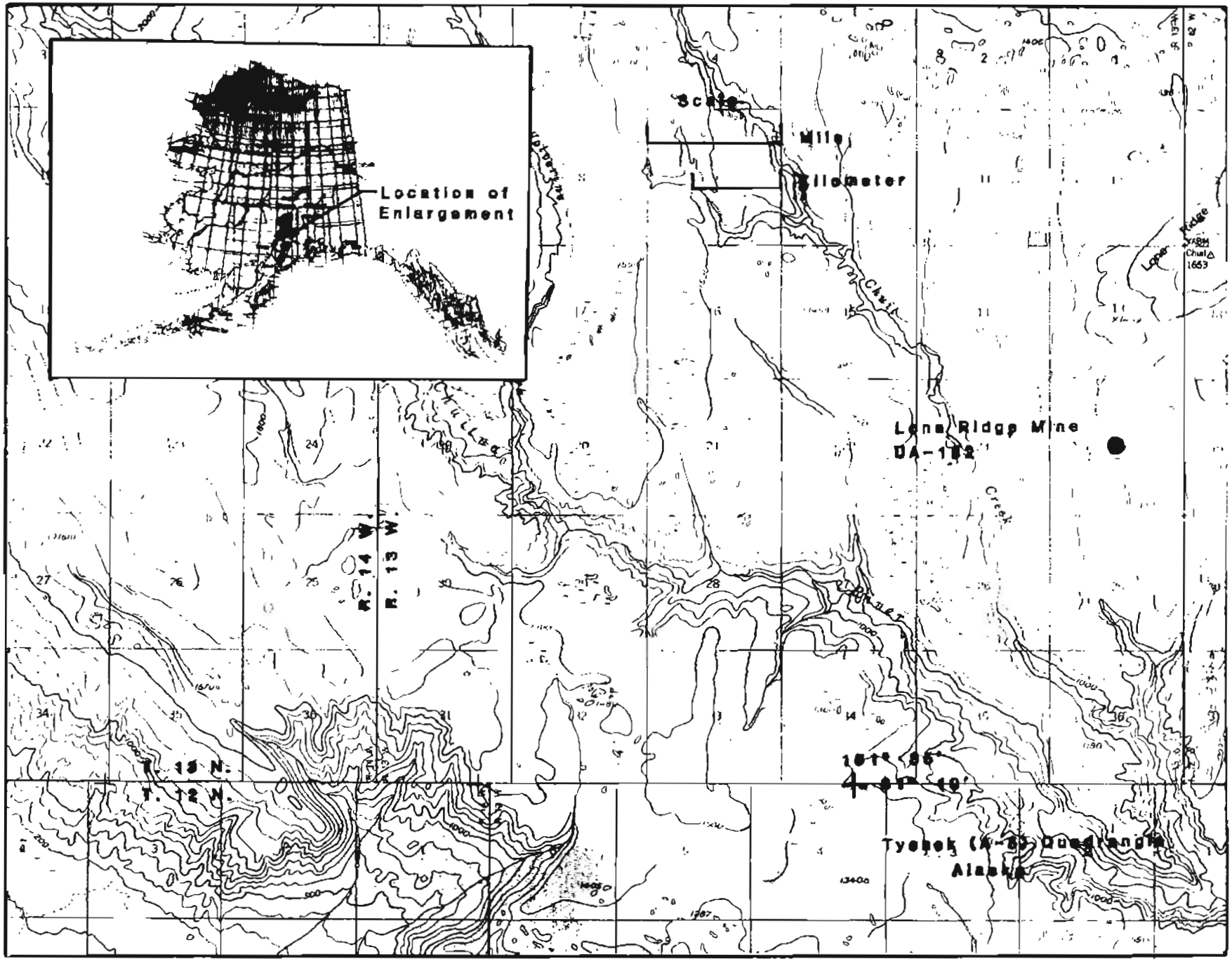


Figure 44. Location of sampling site at the Lone Ridge mine in the Beluga field.

Figure 45. View of pit dug by Placer Amex, Inc. for obtaining bulk samples for shipment to Japan. Sample UA-152 was obtained from this pit.

Figure 52 is an aerial view of the sampling location on Canyon Creek and Figure 53 gives a closeup view of the seam sampled.

There are several outcrops in the Canyon Creek area, as indicated by Barnes (1966). The Mobil Oil Corp. drilling program seemed to indicate the presence of up to five seams ranging in thickness from 10 to 45 feet. In one area in Canyon Creek, Mobil Oil Corp. identified a coal zone where four distinct seams come close together, giving 63 feet of net coal in a 77 foot interval (Blumer). Mobil Oil Corp. identified an in-place resource of 500 million tons to a depth of 250 feet.

There are numerous outcrops of Kenai Group in the northern part of the Yentna region. Much of the area is covered by a mantle of Quaternary deposits (Barnes, 1966) concludes "outcrops of the Kenai Formation (now Kenai Group), though mostly of small extent, are so widely distributed as to leave little doubt that the formation underlies much of the lowland areas." Occurrences of coal in the Fairview Mountain area was first described by Capps. An outcrop on Chicago Gulch was determined by Wolff, et al. (1966) to be Seldovian (Figure 39). Of all the coal outcrops in the region, the thickest was Locality 2 (Figure 54, 55) described by Barnes (1966). This uncorrelated bed is 55 feet thick and has no visible partings. The middle part of the bed was covered with gravel and could not be reached for sampling. A sample (UA-115) was taken of the ten foot section of this uncorrelated bed below the gravel, and the ten foot section of this uncorrelated coal bed above the gravel (UA-116). The sampled outcrop is approximately 23 air miles from Peters Creek and access was via helicopter. Peters Creek is about 25 miles on Peters Creek Road from the Cache Creek Station on the Parks Highway.

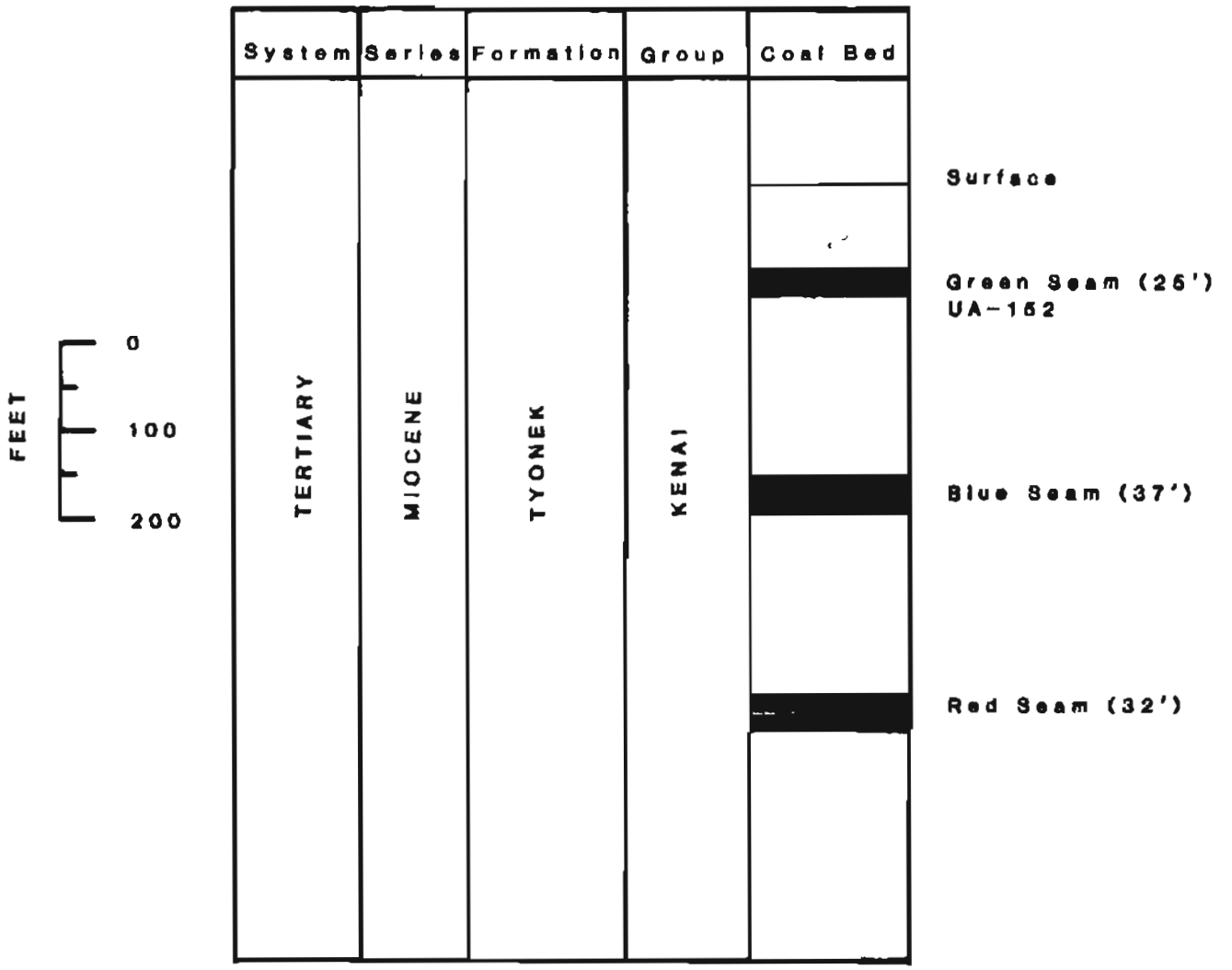


Figure 46. Geological column showing mineable coal beds at Lone Ridge mine, Beluga coal field.

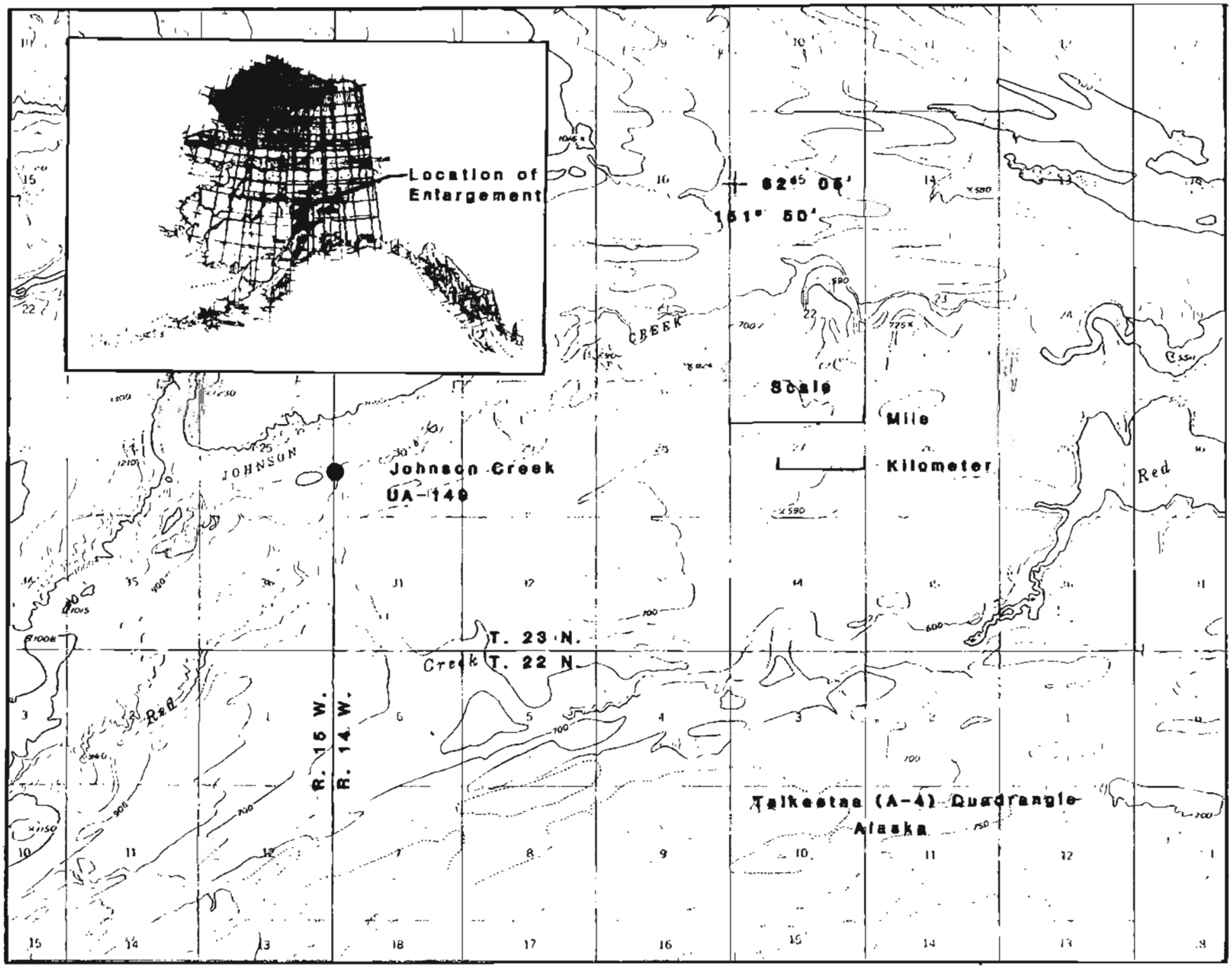


Figure 47. Location of sampling site on Johnson Creek in the Yentna field.

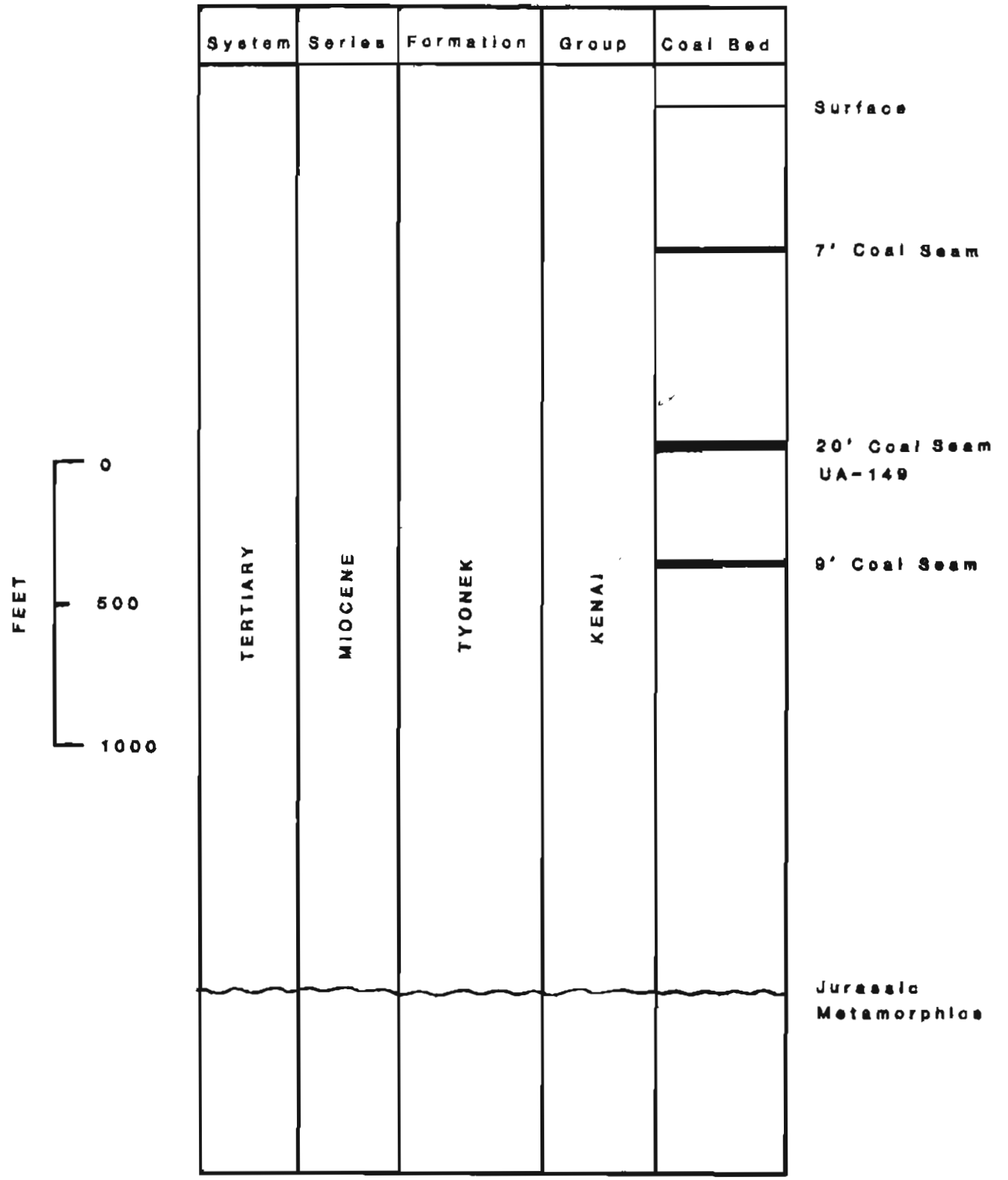


Figure 48. Geological column showing mineable coal beds exposed along the Johnson Creek, Yentna coal field.

Figure 49. A closeup view of outcrop on Johnson Creek.

Kenai

Much of the Kenai lowland is underlain by coal bearing rocks. Coal exposures are found extensively on steep bluffs along the east shore of the Cook Inlet, rising at places to 200 feet above the beach. Barnes and Cobb (1959) made a detailed study of those outcrops and presented extensive sections of these exposures. The beds are not massive in thickness; however, Barnes identified at least 30 beds ranging in thickness from three to seven feet.

Coal has been mined in the Homer district since 1888. There has been no mining since 1951 when the Homer Coal Corporation ceased operations. Some residents of the Homer areas still collect coal from the beach for domestic use, particularly after a severe storm. The sample collected (UA-118) is from the Cabin coal bed and is 6 feet thick and has about 5 feet of overburden at the sampling location (Figure 56). A geologic column showing the coal beds in the Kenai field is presented in Figure 57. The bed outcrops on a vertical face and sampling was accomplished with the aid of technical rock climbing equipment. Two other uncorrelated seams were sampled, one at Ninilchik (UA-122, Figure 58, 59) and one at Happy Creek (UA-131), located on Figure 60.

Matanuska

Matanuska coal field is about 45 miles northeast of Anchorage on the Glenn Highway. In the Upper Matanuska Valley, the coal increases in rank from high volatile A bituminous at the Castle Mountain Mine, to anthracite at the Anthracite Ridge. The coal in the Wishbone Hill District of the Lower Matanuska Valley is high volatile B bituminous. The coal seams are limited to the Chickaloon formation of Tertiary age. This formation consists of

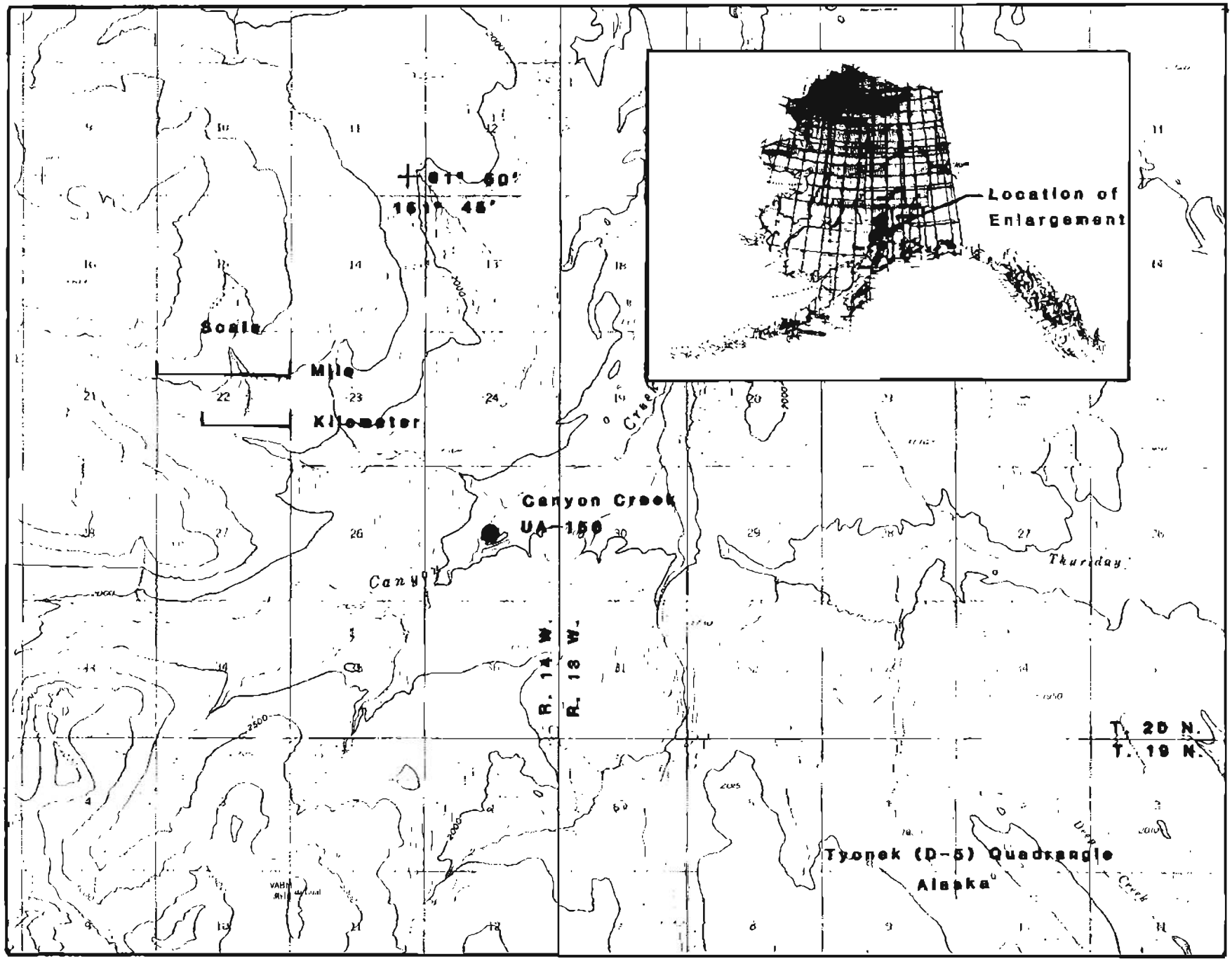


Figure 50. Location of sampling site on Canyon Creek in the Yentna field.

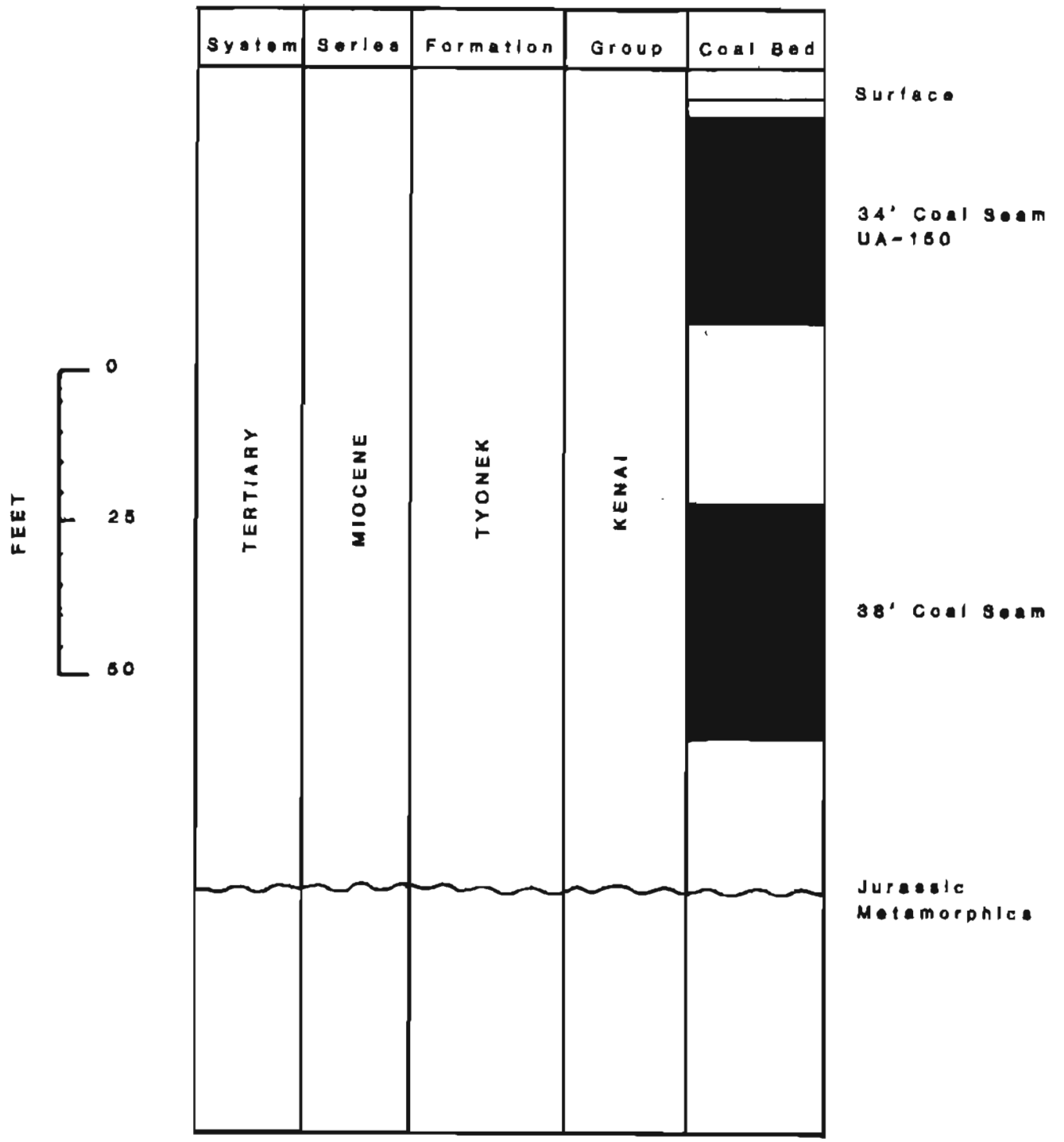


Figure 51. Geological column showing mineable coal beds exposed along the Canyon Creek, Yentna coal field.

Figure 52. Aerial view of outcrop on Canyon Creek, the sampling site for UA-150.

Figure 53. A closeup view of the outcrop on Canyon Creek.

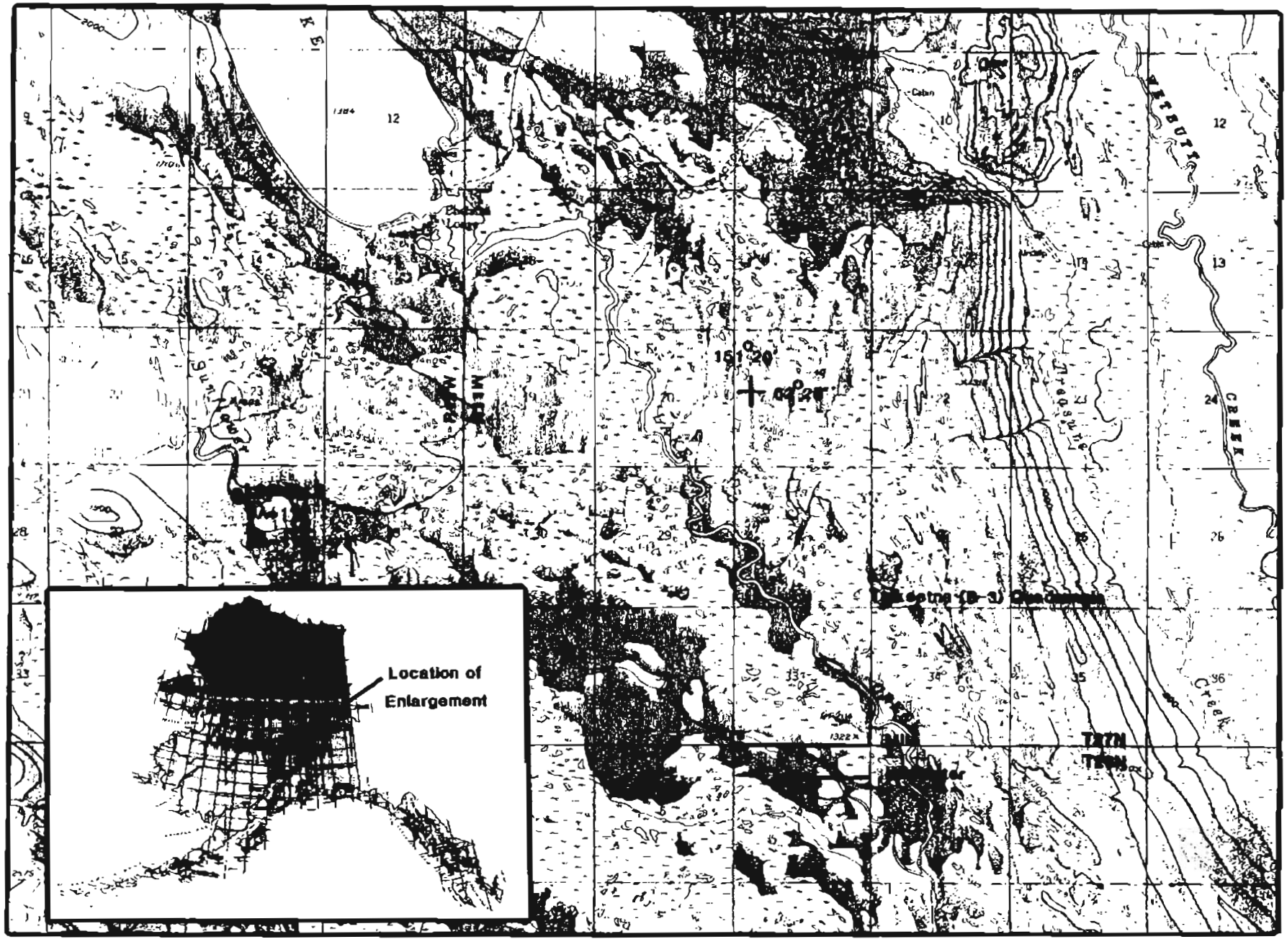


Figure 54. Sampling location in the Yentna field.

Figure 55. A closeup view of sampling location at Locality 2.

nonmarine rocks that include all gradations from coarse sandstone and conglomerate to claystone. It is concealed by a mantle of Quaternary deposits or by a capping of younger Tertiary conglomerate (Barnes, 1945, Barnes and Payne, 1956).

A coal seam sampled at the Premier Mine (UA-108) is from a region highly faulted and at the crest of an anticline. This seam could not be correlated or located in the general geological section (Figure 62).

Wishbone Hill is the site of the Evan Jones coal mine that operated until 1968 (Tucker, 1968). The predominant structural feature of Wishbone Hill consists of a broad plunging syncline 1-1/2 miles wide and six or more miles long. Six coal beds were sampled from the northeast corner of Wishbone Hill. Figure 61 shows the sampling site. A composite geological column showing mineable coal beds is presented in Figure 62. Figure 63 is a photograph of the surface mined pit, where the samples were taken. Seams sampled were Bed No. 7A (UA-142), Bed No. 7 Lower (UA-143), Bed No. 7 Upper (UA-144), Bed No. 6 Lower (UA-145), Bed No. 6 Upper (UA-146) and Bed No. 5 (UA-147). The bulk of the coal resources of the Matanuska field are in the Wishbone Hill district (Jolley et al., 1952). Barnes estimates 52 million tons of indicated resources plus 54 million tons of inferred resources in the district. Patsch (1980) estimates the remaining Evan Jones coal reserves at 30 to 50 million tons of recoverable good quality coal, but it would require an innovative underground mining method for production.

There are two coal beds exposed at the Castle Mountain Mine (not operated since the early 1960's) (Figure 64, 65). The lower bed, 7.0 feet thick, was sampled (UA-107); the

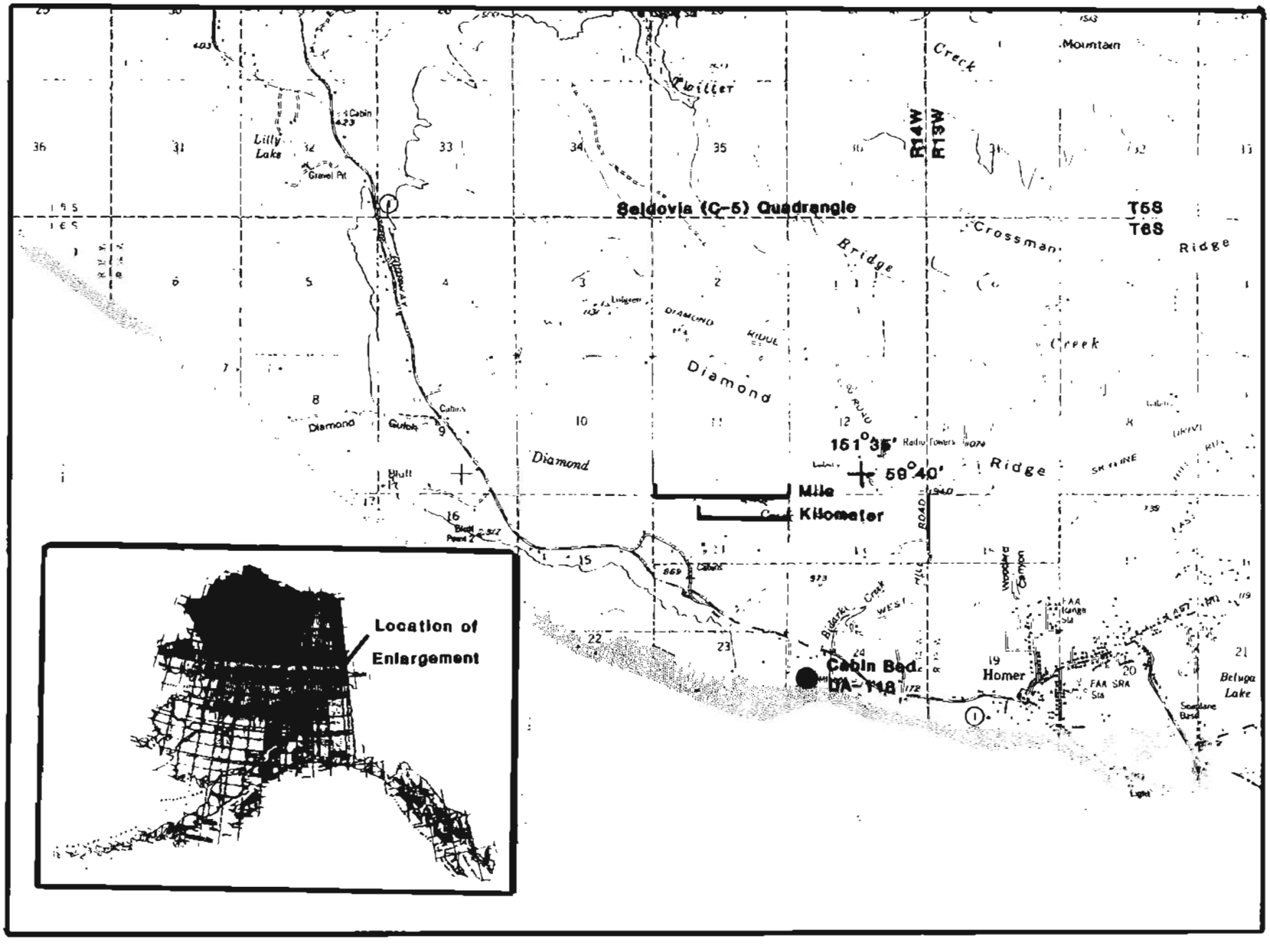


Figure 56. Sampling location in the Kenai field.

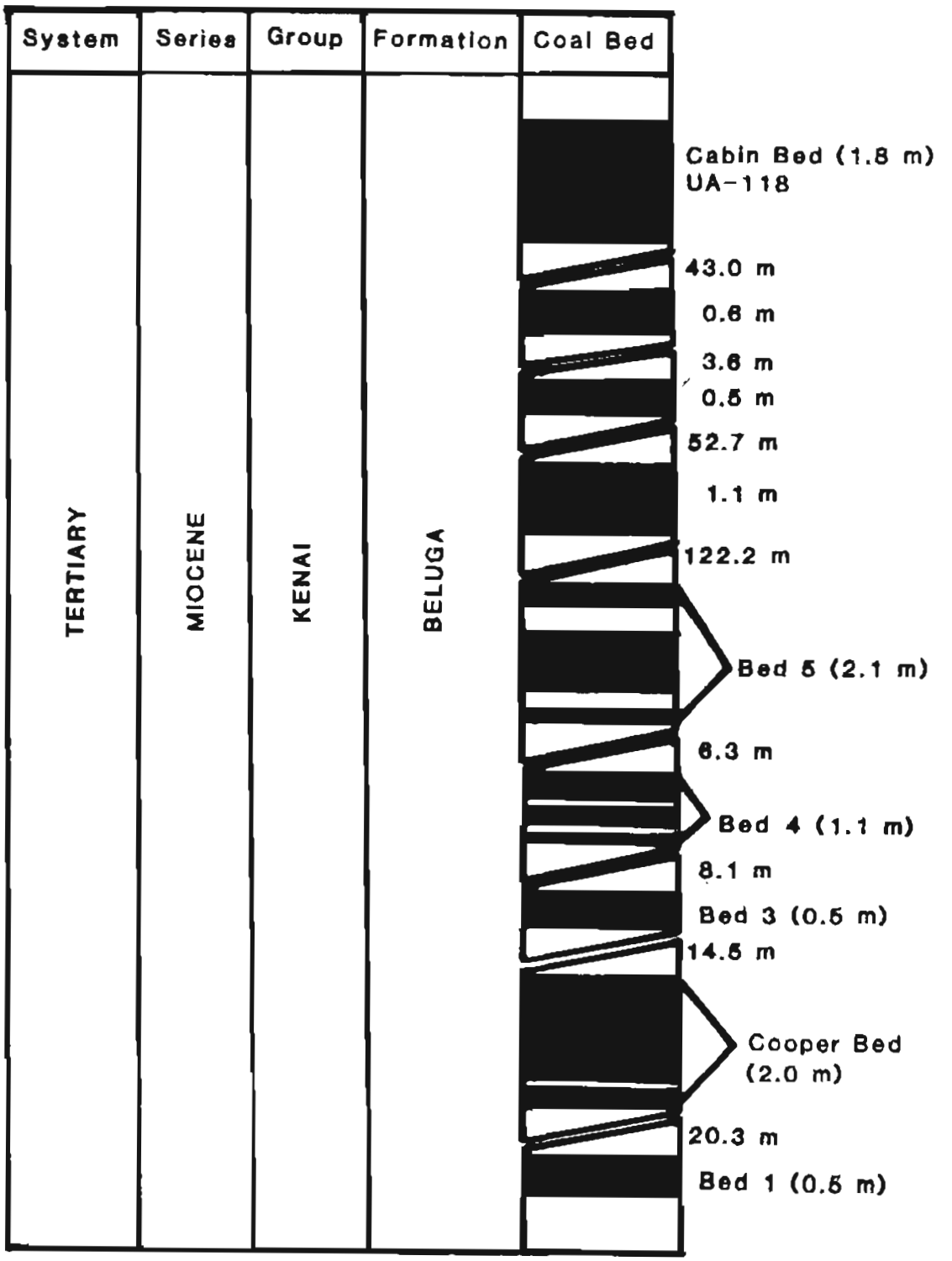


Figure 57. Geological column showing mineable coal beds near Homer, Kenai coal field (Source: Barnes and Cobb, 1959).

Figure 58. Coal outcrop near Ninilchik, with underclays washed out by wave action, forming a natural cave with coal as resistant roof.

upper bed, 5.0 feet thick, was not. Continuity of the coal beds has not been established and the remaining resources of the seams are not known. Complex structure, lack of continuity of coal beds, and widespread igneous intrusions add to the difficulties in estimating the reserves (Barnes, 1962).

Broad Pass

Broad Pass coal field is located near Broad Pass station, 166 miles south of the Alaska Railroad and Parks Highway. The field may be divided into two basins.

Coal Creek Basin is located on the east side of the Alaska Railroad and lies in an area three miles long and one mile wide (Hopkins, 1951). About 1-1/2 square miles are known to be underlain by coal bearing rocks.

Coal was mined from the basin until the mid 1940's. A sample of the Coal Creek coal bed (UA-111) was collected from an outcrop near the former Coal Creek mine (Figure 66, 67). The Coal Creek coal bed is 8 feet thick and is covered by unconsolidated sediments. The locality can be accessed via an old wagon trail from the Parks Highway. The trail crosses several streams and the access is limited to four-wheel drive vehicles.

The Costello Creek Basin (Wahrhaftig, 1944) is on the west side of the railroad and covers about seven square miles. Coal occurs in Tertiary sequences of sandstone and claystones. There are three mineable coal beds in this basin, i.e. the Dunkle bed (5 feet thick), Lower Billie bed (3.4 feet thick) and Upper Billie bed (3.9 feet thick). Coal was mined from this basin until the early 1950's at the Dunkle Mine (Figure 68). Analyses of shipped coal samples

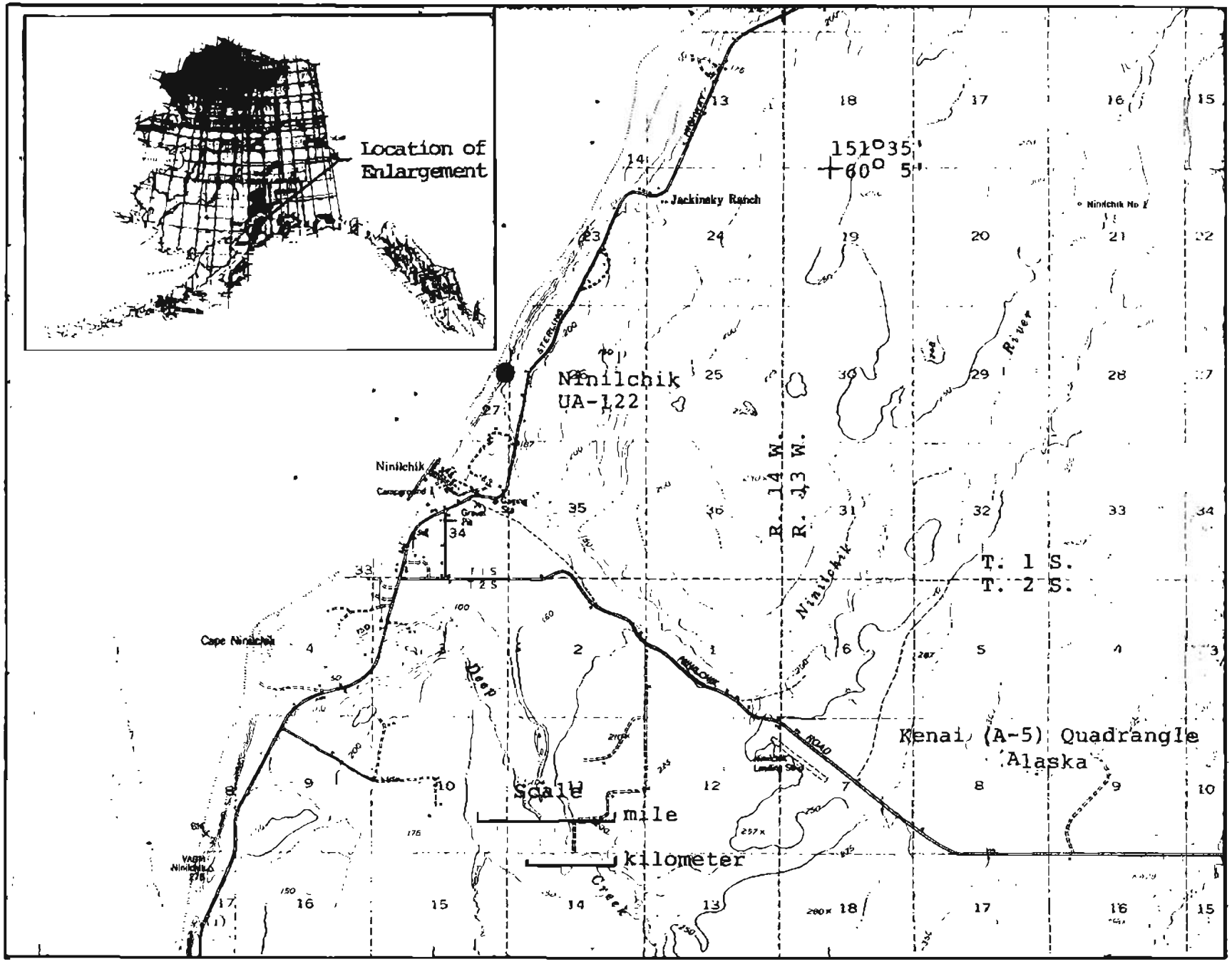


Figure 59. Location of sampling site near Ninilchik, Kenai coal field.

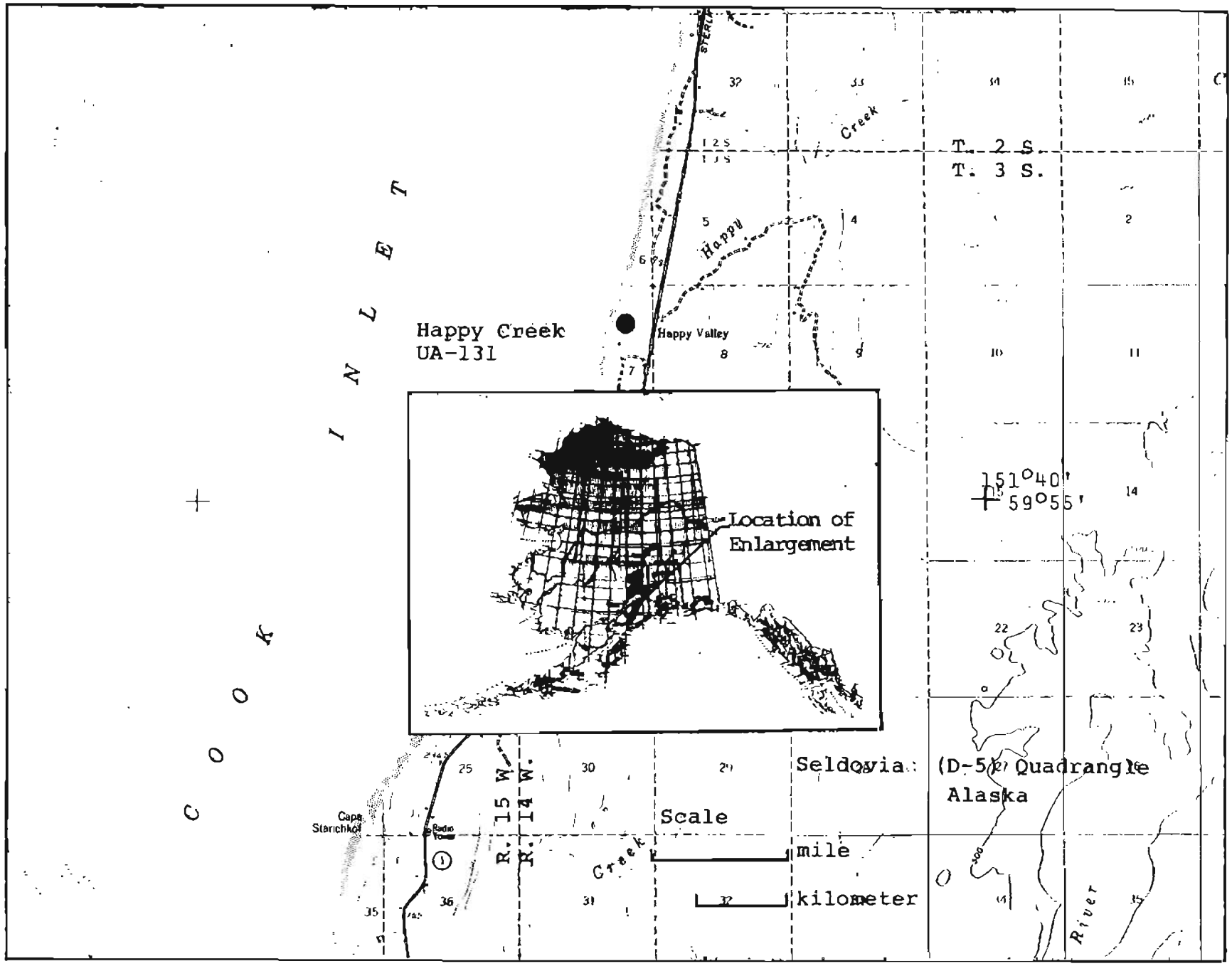


Figure 60. Location of sampling site on Happy Creek, Kenai coal field.

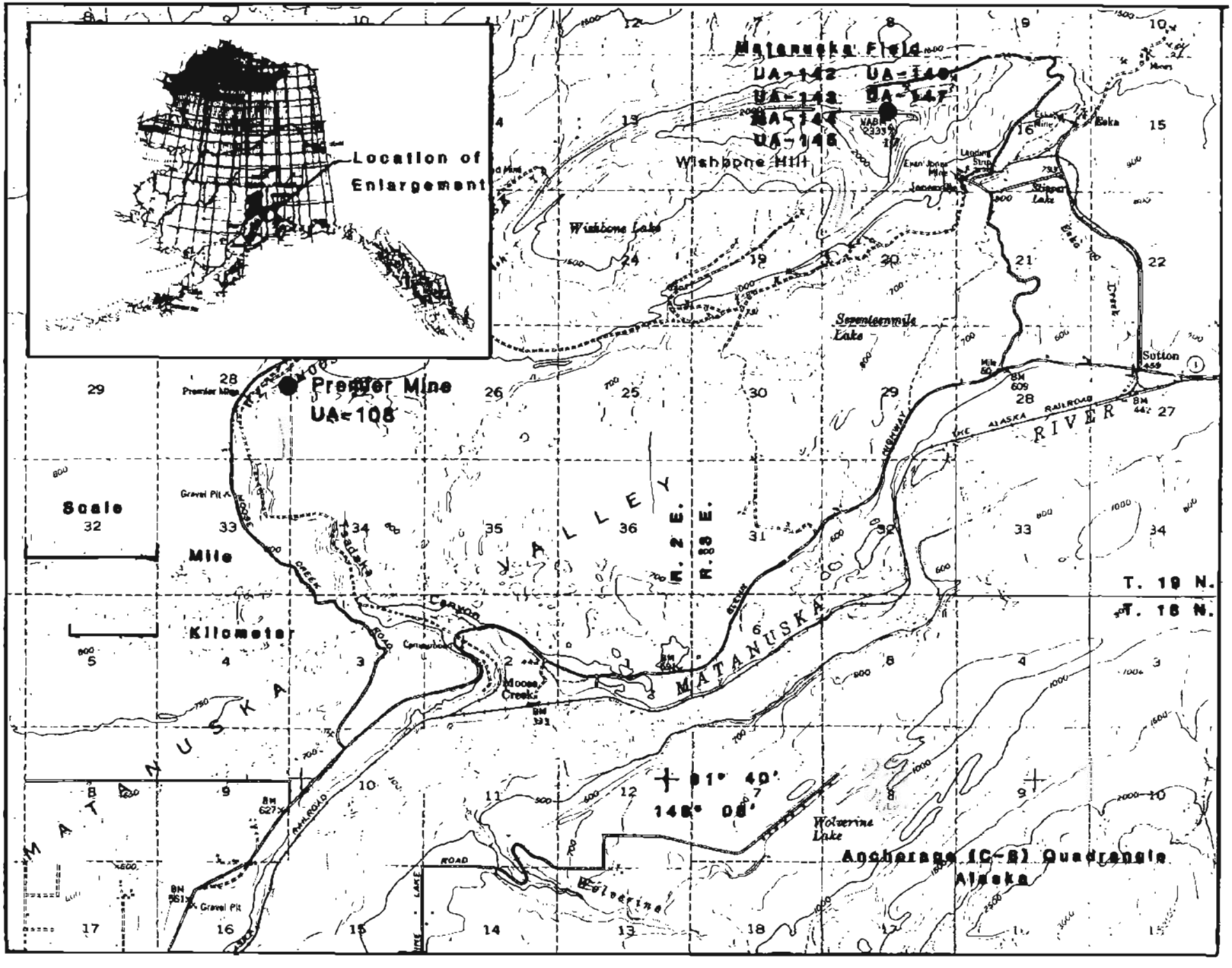


Figure 61. Location of sampling site in the Lower Matanuska Valley, Matanuska coal field.

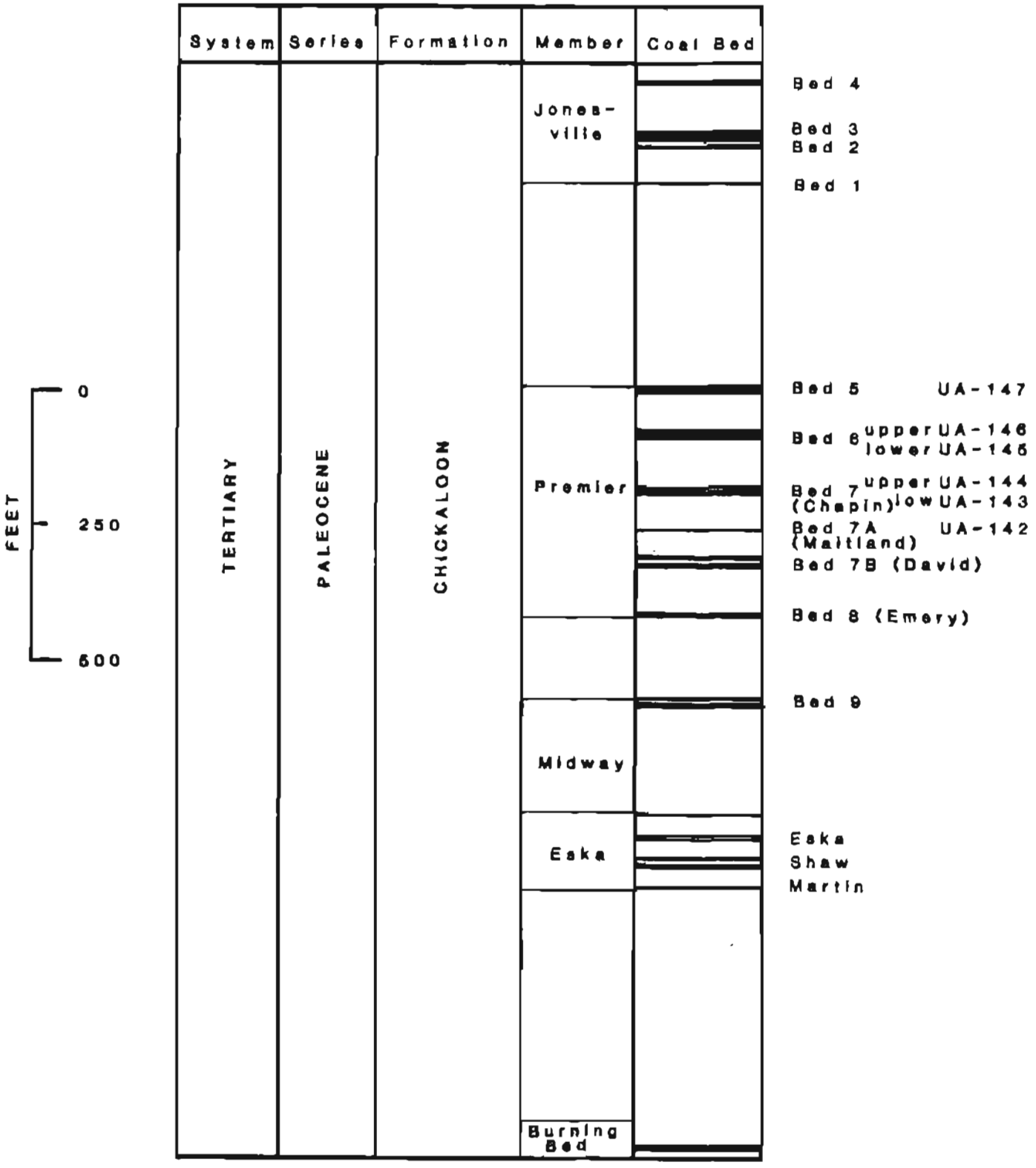


Figure 62. Geological column showing mineable coal beds in the Wishbone Hill District, Matanuska coal field.

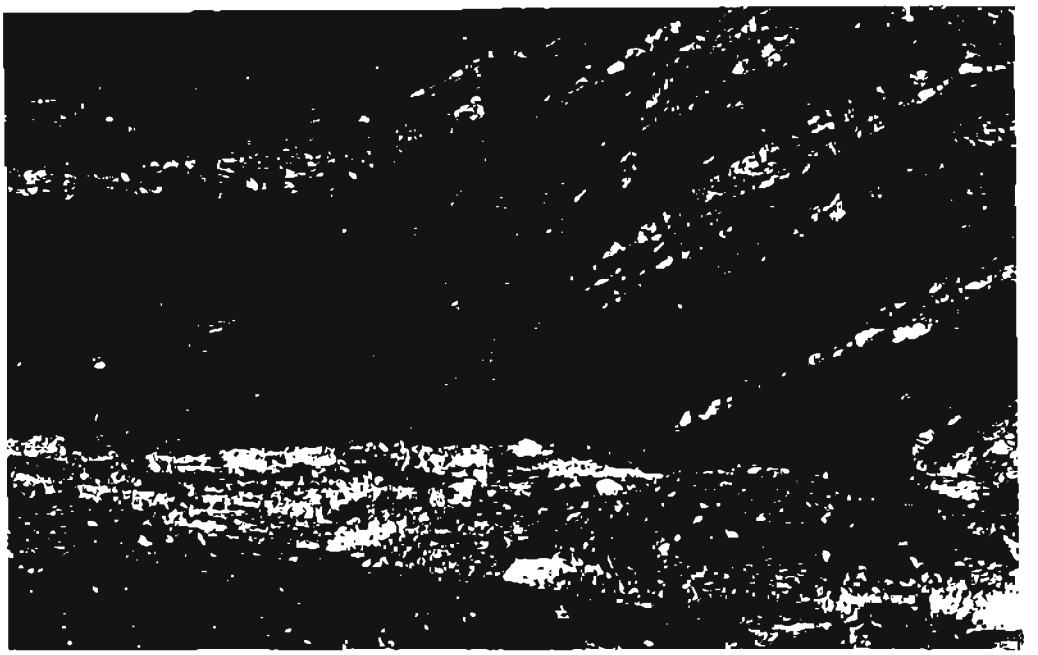


Figure 63. General view of Evan Jones surface mined pit at the northeast corner of Wishbone Hill. Samples UA-142, 143, 144, 145, 146 and 147 were obtained from this site.

reported by Wahrhaftig indicated the coal to be of subbituminous rank. The Dunkle bed was sampled for this study (UA-123).

SOUTHWEST ALASKA FIELDS

Little Tonzona

Occurrences of coal near Farewell were first observed by Brooks (1911) in 1902. Capps (1919) described 20 foot thick coal beds in tertiary nonmarine sedimentary rocks south of Kantishna; however, the Little Tonzona coal bed was first described in 1977 by Player (1976). A sample of this coal bed (UA-112) was collected from an outcrop section of the bed.

Coal beds occur in Tertiary nonmarine sandstone, siltstone and volcanic rocks in widespread isolated exposures north and south of Farewell fault from Big River northeast to Kantishna and beyond (Player, 1976). The sampled bed occurs in an isolated exposure of Tertiary nonmarine sedimentary rocks on the south west bank of the Little Tonzona River (Figure 69). Beds strike N60°E to N70°E and dip 55° to 70° northwest (Player, 1976). The total stratigraphic thickness measured by Player is about 195 feet.

Subsequent to author's sampling in 1978 of the Little Tonzona Bed coal (UA-112, Figure 69) McIntyre Mines under the direction of Walter Thor conducted prospecting and geological mapping during the summer of 1980. They identified a strike length of greater than three miles of coal bearing strata bearing a minimum cumulative width of 134 feet of coal beds. During the summer of 1981 they drilled 6 holes and collected a total of 147 samples of coal

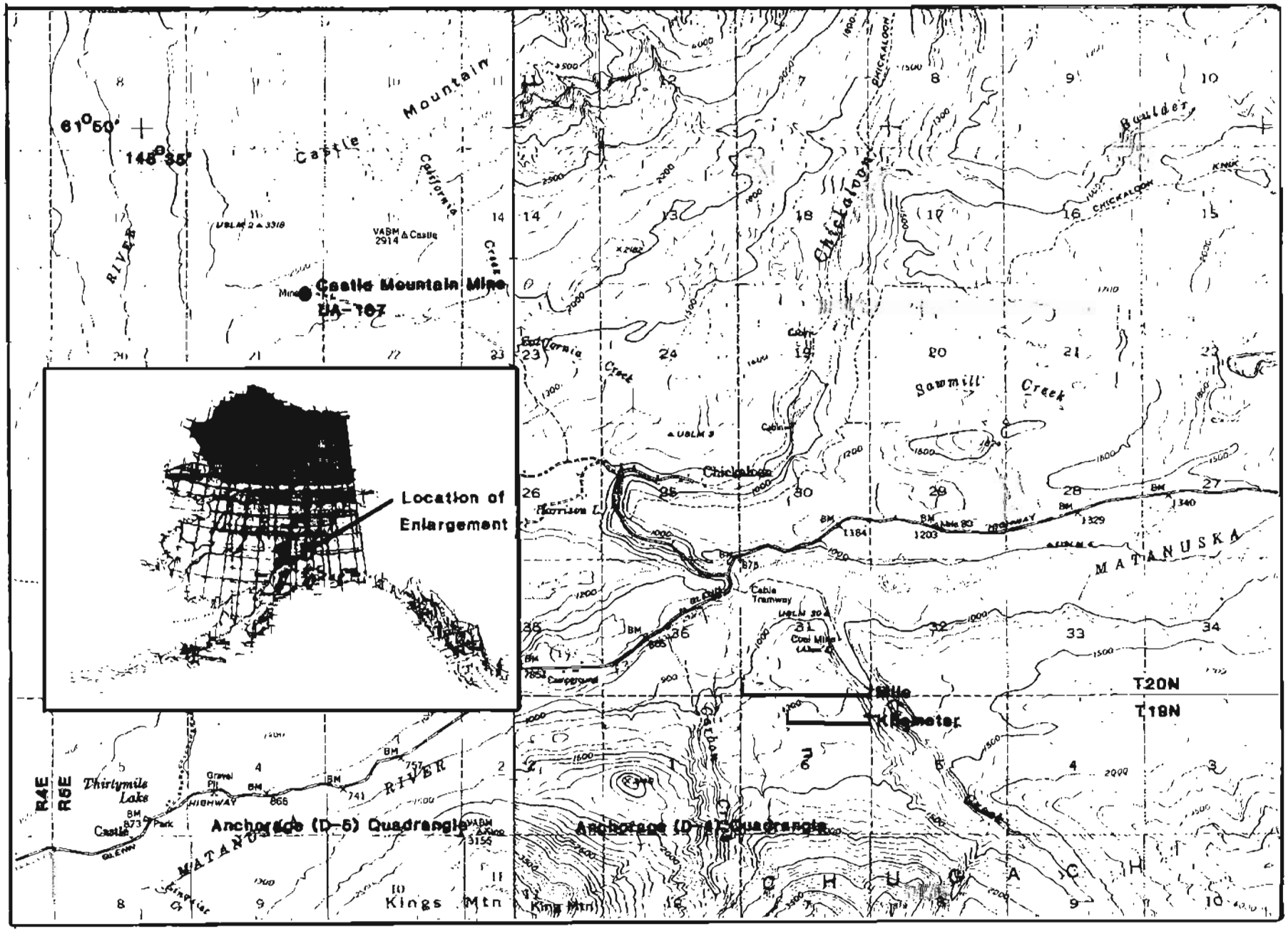


Figure 64. Location of sampling site in the Upper Matanuska Valley, Matanuska coal field.

Figure 65. View of sampling site at Castle Mountain mine.

with a core length of 2 feet or greater. Figure 70 is a crossection by Thorpe (1982) and is an interpretation from the outcrop along the Little Tonzona River as well as two drill holes located close to the river bank at two different angles. Rao (1981) reported washability and raw coal analyses of these core samples. One of the drill holes measured as much as 173 feet of coal. Figure 71 is a view of coal outcrop along the Little Tonzona River.

ALASKA PENINSULA FIELDS

Chignik

Coal has been reported at several localities in the Alaska Peninsula, and actually mined at Herendeen Bay, Chignik and Unga Island. The uncorrelated bed coal sample for this study was collected from the mine tunnel of the Chignik River mine (UA-136, Figure 72, 73) that operated from 1893 to 1911, providing fuel for the nearby Alaska Packers Association Cannery. Coal is found in the Chignik formation of Upper Cretaceous age (Figure 74).

Herendeen Bay

Coal is known at several localities in the vicinity of Herendeen Bay (Gates, 1944). Paige (1906) reports that mining and development between 1890 and 1898 included 6 tunnels ranging up to 205 feet long and these tunnels were caved by 1905 when Paige examined the area. There are not sufficient data to permit evaluation of coal resources. Gates (1944) estimates 5 to 10 million tons of inferred resources under the most favorable circumstances of continuity of beds into the north limb of the syncline. Cornwell and Triplehorn sampled several seams from various locations in the region. The uncorrelated bed coal sample collected for washability (UA-138) study was from the west shore of Herendeen Bay, near

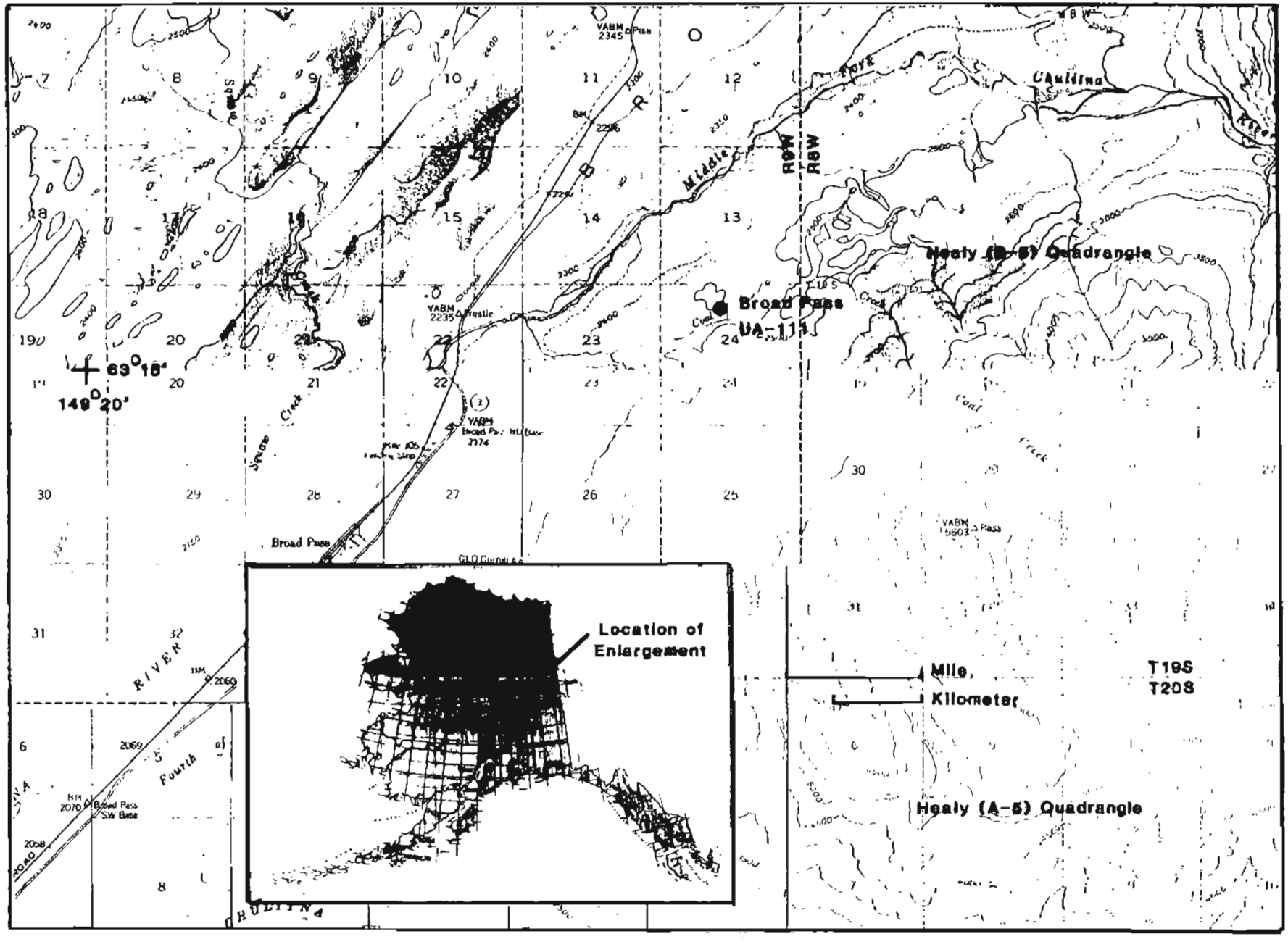


Figure 66. Sampling location in the Broad Pass field.

Figure 67. View of sampling site on Coal Creek.

Coal Point (Figure 75, 76). Figure 74 shows the correlation of Cretaceous rocks of the Alaska Peninsula. The exact age of the formation in which coal occurs is uncertain.

LABORATORY PROCEDURES

This investigation closely followed the laboratory procedures described by Cavallaro et al. (1976) and described by the authors in Phase I (Rao and Wolff, 1978). Figure 77 is a flowsheet of procedures used in the laboratory for processing the samples. Raw coal samples were crushed to 1-1/2 inches, 3/8 inch, and 14 mesh sizes. Minus 100 mesh material was removed from the 1-1/2 inches and 3/8 inch crushed samples, leaving the coarse fraction for float-sink testing in 60 liter containers. 14 mesh x 0 samples were separated in glass separatory flasks joined by ground taper joints. Float-sink separations were made at 1.30, 1.40 and 1.60 specific gravities, using perchlorethylene-naptha mixtures as heavy liquid. The air dried products were first crushed in a hammer mill to 14 mesh and pulverized to 60 mesh for analysis. Proximate and ultimate analyses of raw coals are presented in Table I. Table II shows Hardgrove Grindability Indexes and F.S.I. of raw coals. The concentration of major elements and the fusibility of ash are presented in Table III. Fusibility of ash of raw coal samples under oxidizing atmosphere is presented in Table IV.

For fine coal washability (Figure 78), air dried 14 mesh raw coal samples were first pulverized in a hammer mill to 65 mesh. A high speed model pulvette pulverizer hammer mill was used for finer grinding. With this pulverizer, use of 0.013" slotted screen gave

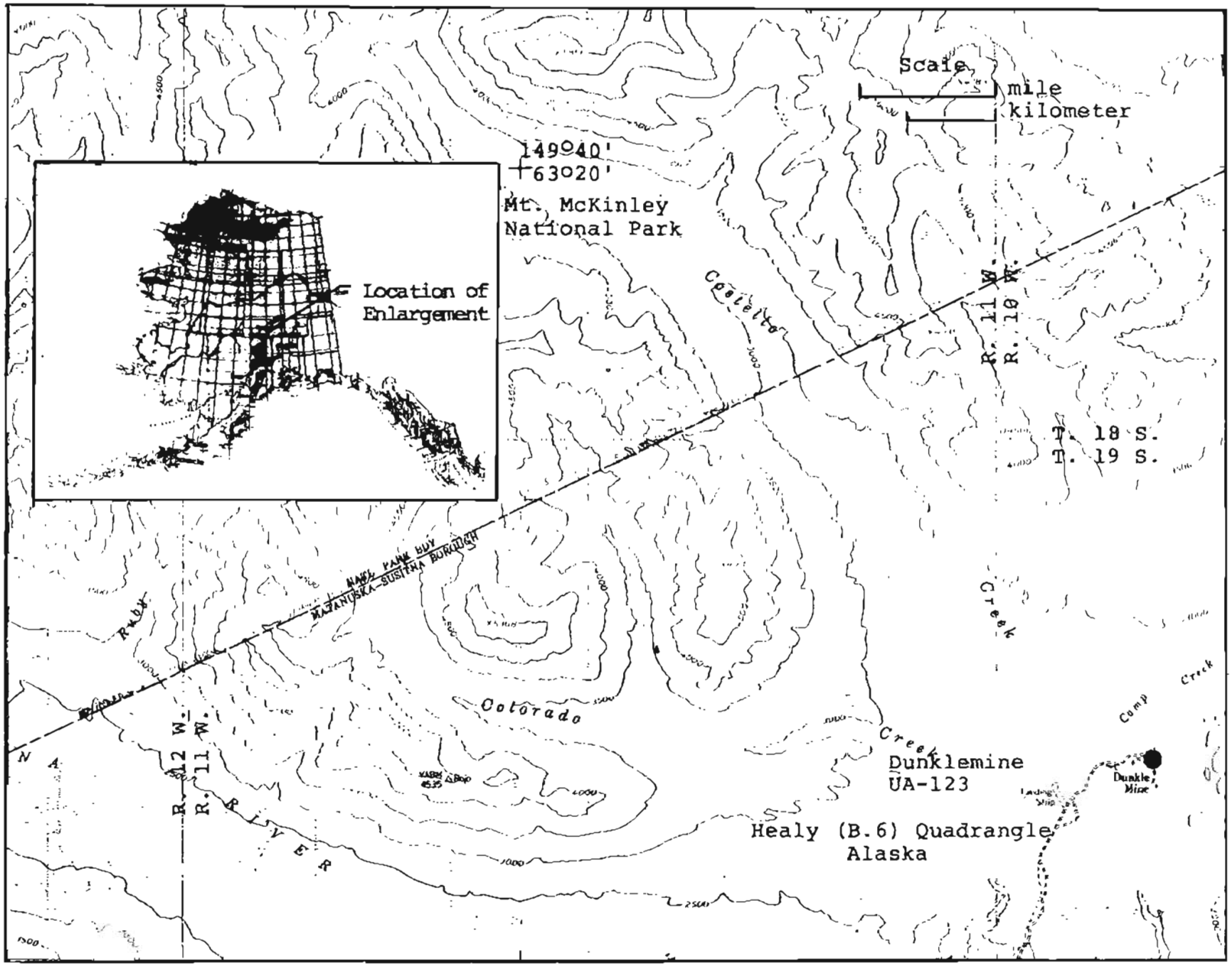


Figure 68. Location of sampling site at the Dunkle mine, Broad Pass coal field.

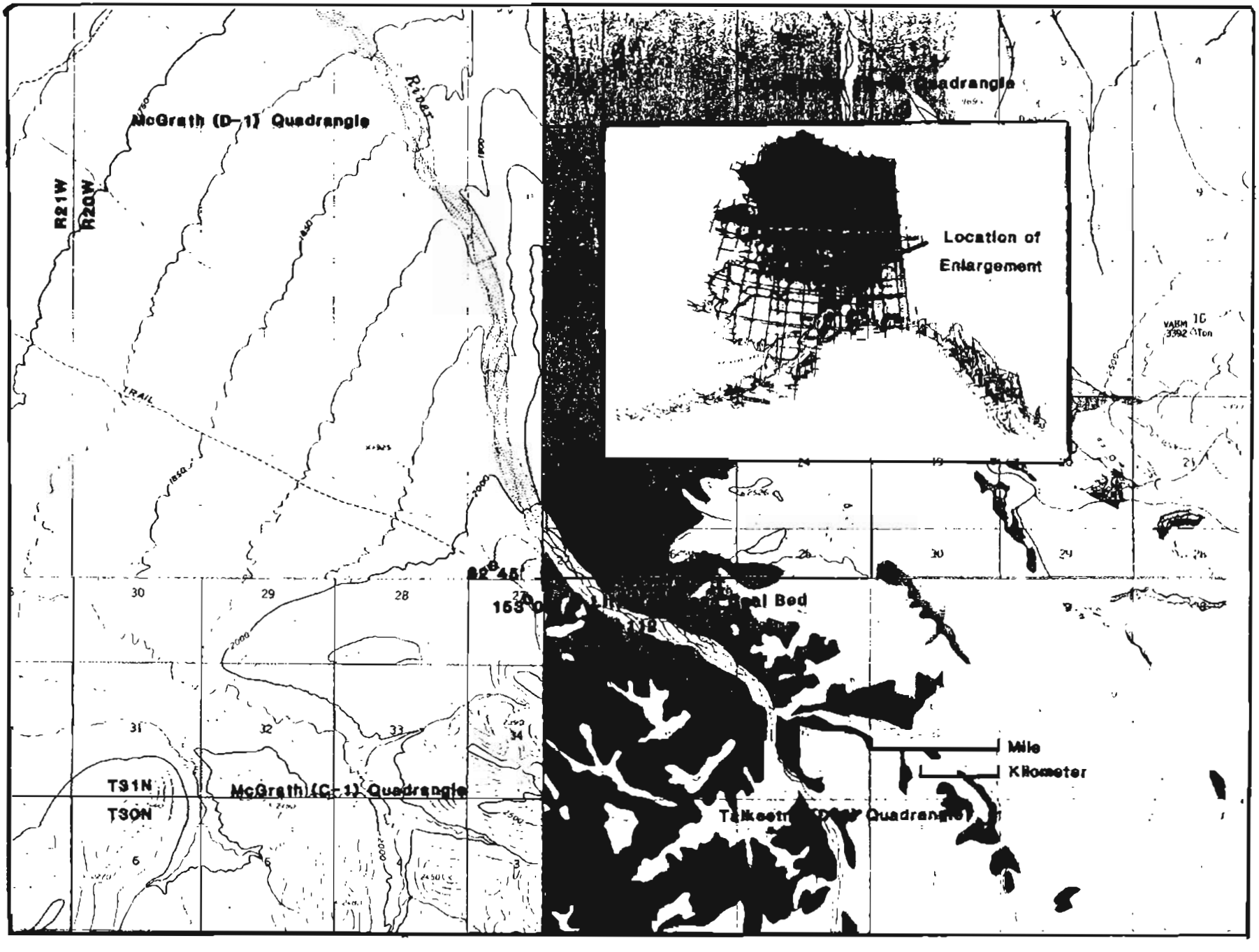


Figure 69. Sampling location of Little Tonzona field.

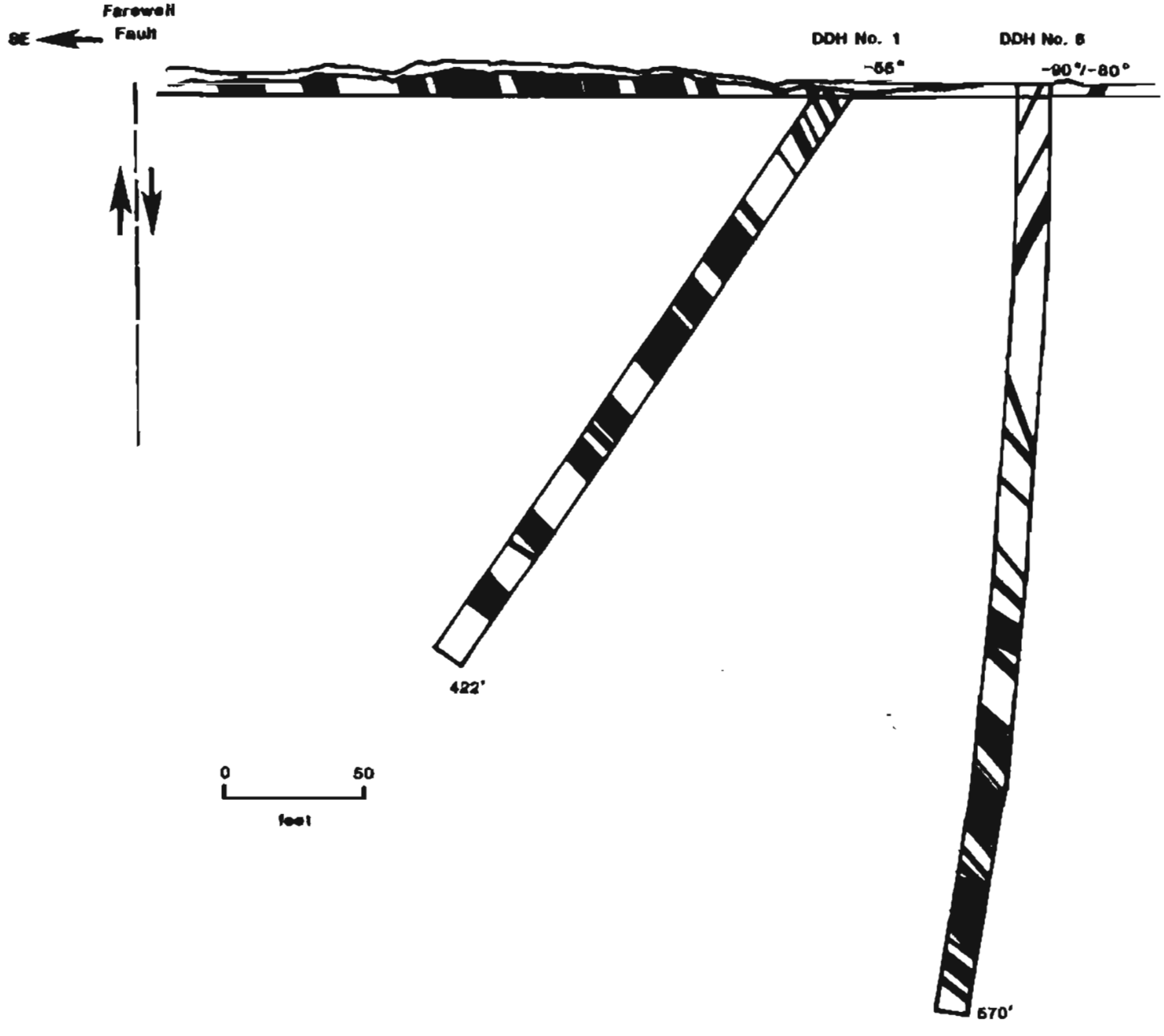


Figure 70. Geological column showing coal exposed along the river as well as two drill holes recorded adjacent to the outcrop.

Figure 71. View of coal bed exposed at the bank of Little Tonzona River.

a product passing 97 percent minus 200 mesh whereas a round hole screen with 0.02" opening gave product with 97 percent passing 325 mesh using 65 mesh coal as feed. Washability analysis at 200 mesh and 325 mesh samples was only conducted for a few samples due to difficulties experienced in dispersing such fine particles in perchlorethylene heavy liquid medium. In the case of subbituminous coals, difficulties were experienced even for 65 mesh coal. Dispersion was enhanced by a) drying samples at 106°C prior to washability analysis; b) addition of aerosol OT to the heavy liquid; and c) mixing coal and heavy liquid in a blender for about ten seconds. The following procedure was adopted in washability testing of 65 mesh and finer samples.

1. Pulverize air dried 14 mesh x 0 coal in a hammer mill pulverizer to 65 mesh.
2. Dry samples in a 1/4" thin layer at 106°C for one hour prior to float-sink testing.
3. Disperse samples in 1.60 Sp.G. liquid containing 0.5 grams/liter aerosol OT in a mini-blender, one centrifuge cup capacity at a time.
4. Where large percentage of float are expected, limit sample size to 10 g/cup.
5. Centrifuge for 20 minutes at 1500 RPM.
6. Filter floats and sinks, dry sinks.
7. Rinse floats with 1.40 Sp.G. liquid.

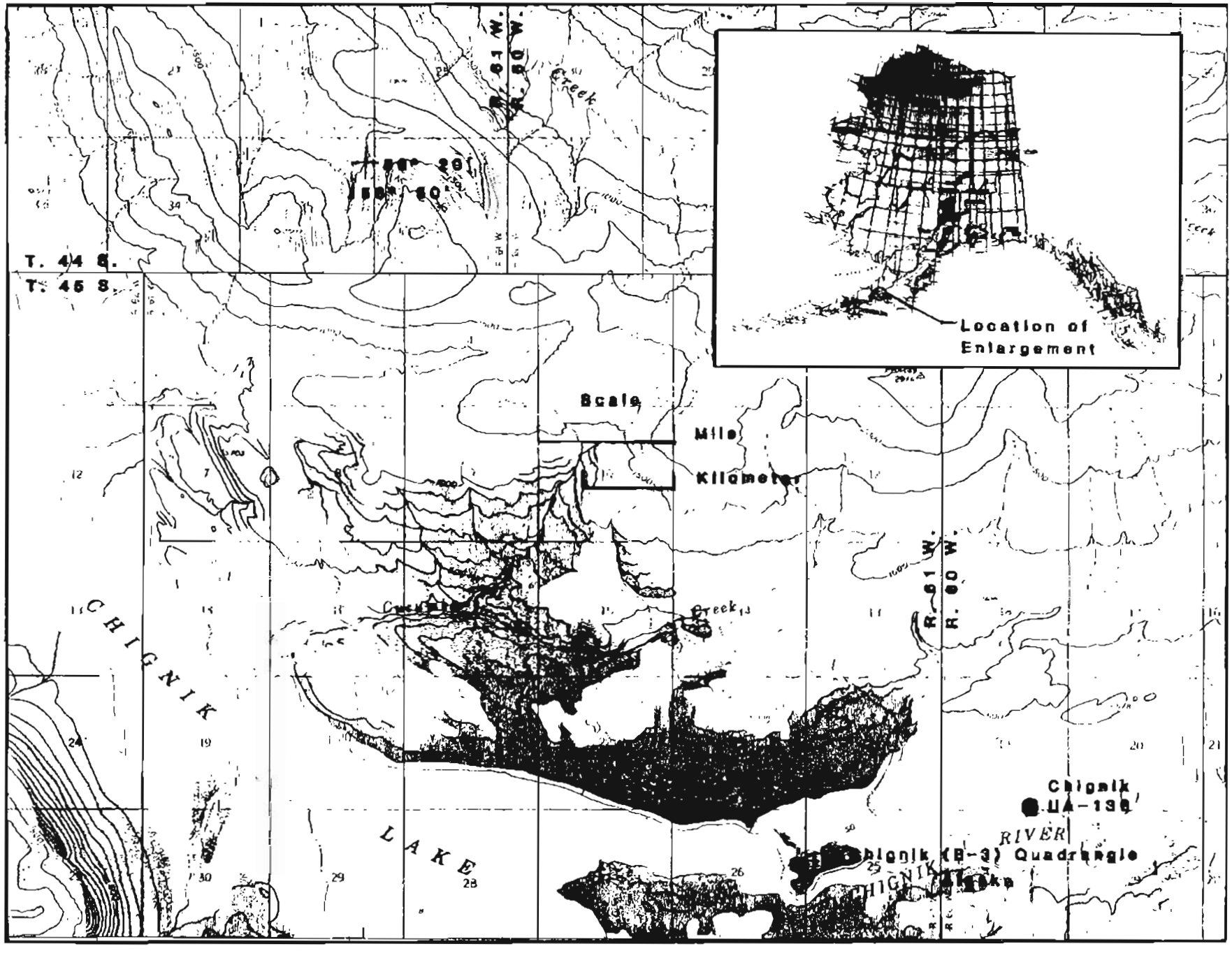


Figure 72. Location of sampling site in the Chignik field.

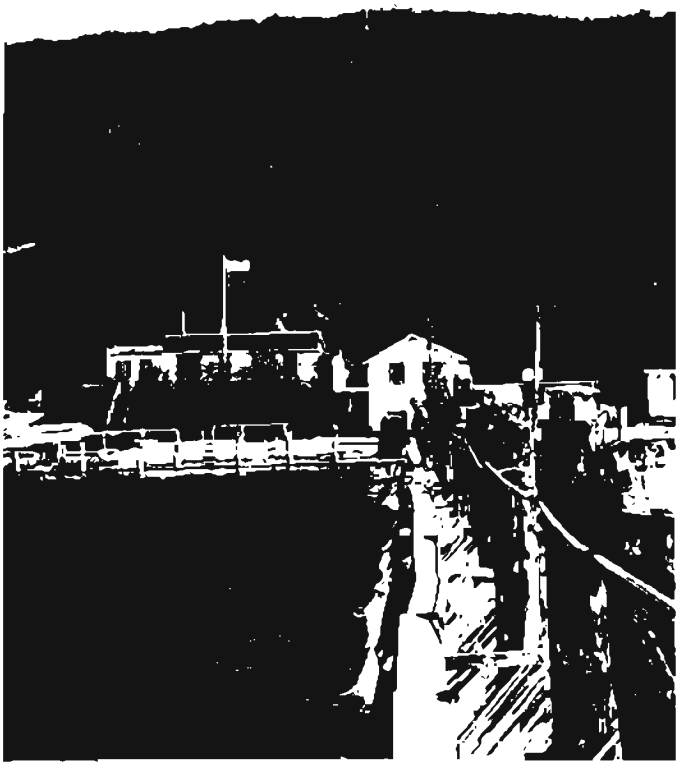


Figure 73. General view showing the location of Chignik mine.

8. Repulp in mini-blender using 1.40 Sp.G. liquid.

9. Centrifuge for 20 minutes at 1500 RPM.

10. Filter floats and sinks, dry sinks.

11. Rinse floats with 1.30 Sp.G. liquid.

12. Centrifuge for 20 minutes, filter and dry both floats and sinks.

Centrifuge bottles were manufactured by Kontes Glass Company as per MIRL design shown in Figure 79, for use with centrifuge cups IEC-3535 without dome. Cushions were fabricated in the MIRL laboratory using tire retreading rubber material. Rings were used to retain the bottles inside the cups in a vertical position. Bottles with the round bottom design were found to withstand stresses induced by centrifuging quite well. Not a single tube was broken during centrifuging. Approximately 250 gm of dried samples were used for float-sink testing. In addition a 250 gm portion was separated at 1.60 Sp.G. and the products were analyzed for proximate and ultimate analysis (Table V), ash composition (Table VI) and ash fusibility under oxidizing atmosphere (Table VIII).

Size analysis of 65 mesh sample was conducted by wet screening using a Ro-top sieve shaker. Wetting of the coal was facilitated by initial wetting with ethanol. The sized products were dried, weighed and analyzed. The data are presented along with washability in thetables.

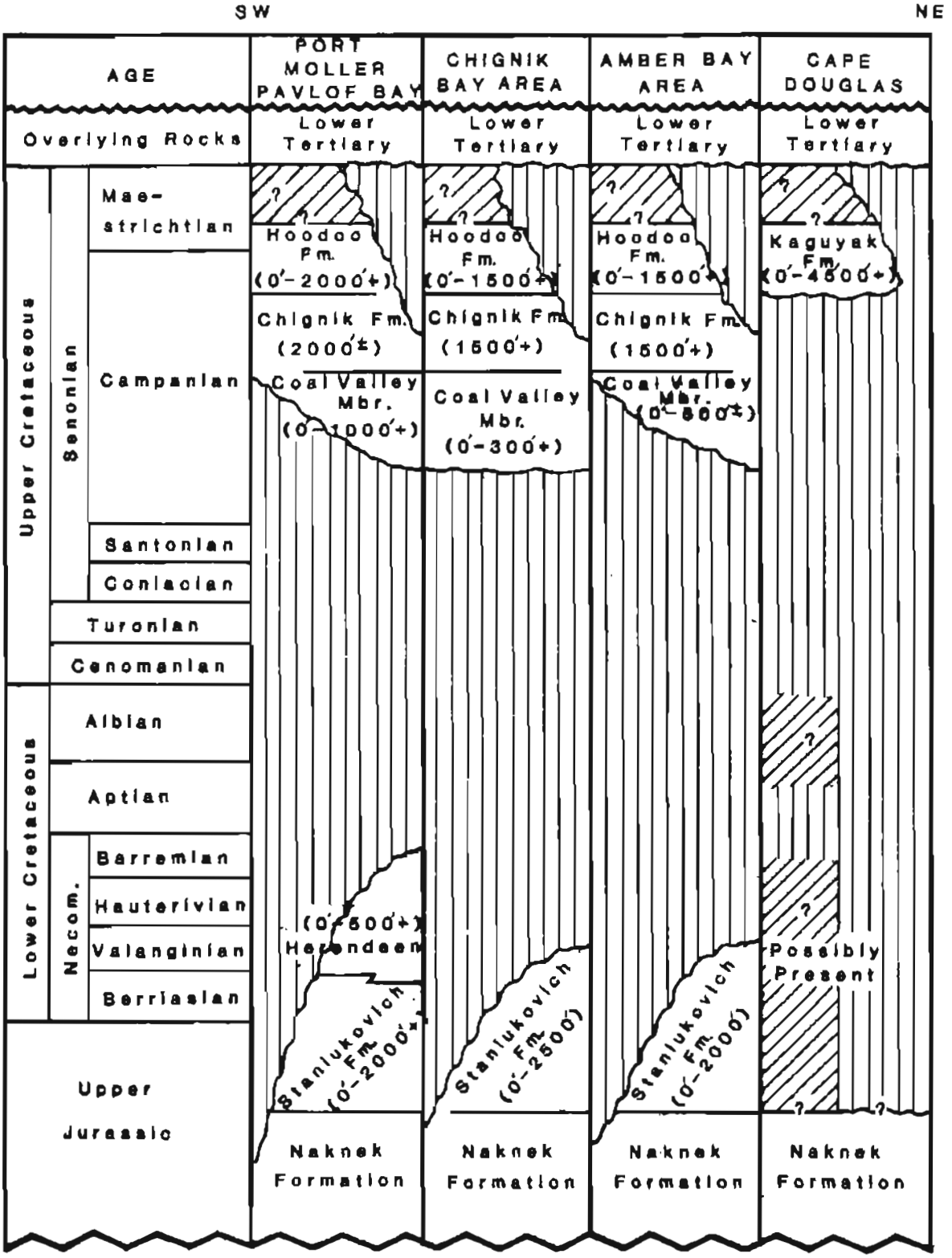


Figure 74. Correlation chart of Cretaceous rocks of Alaska Peninsula.

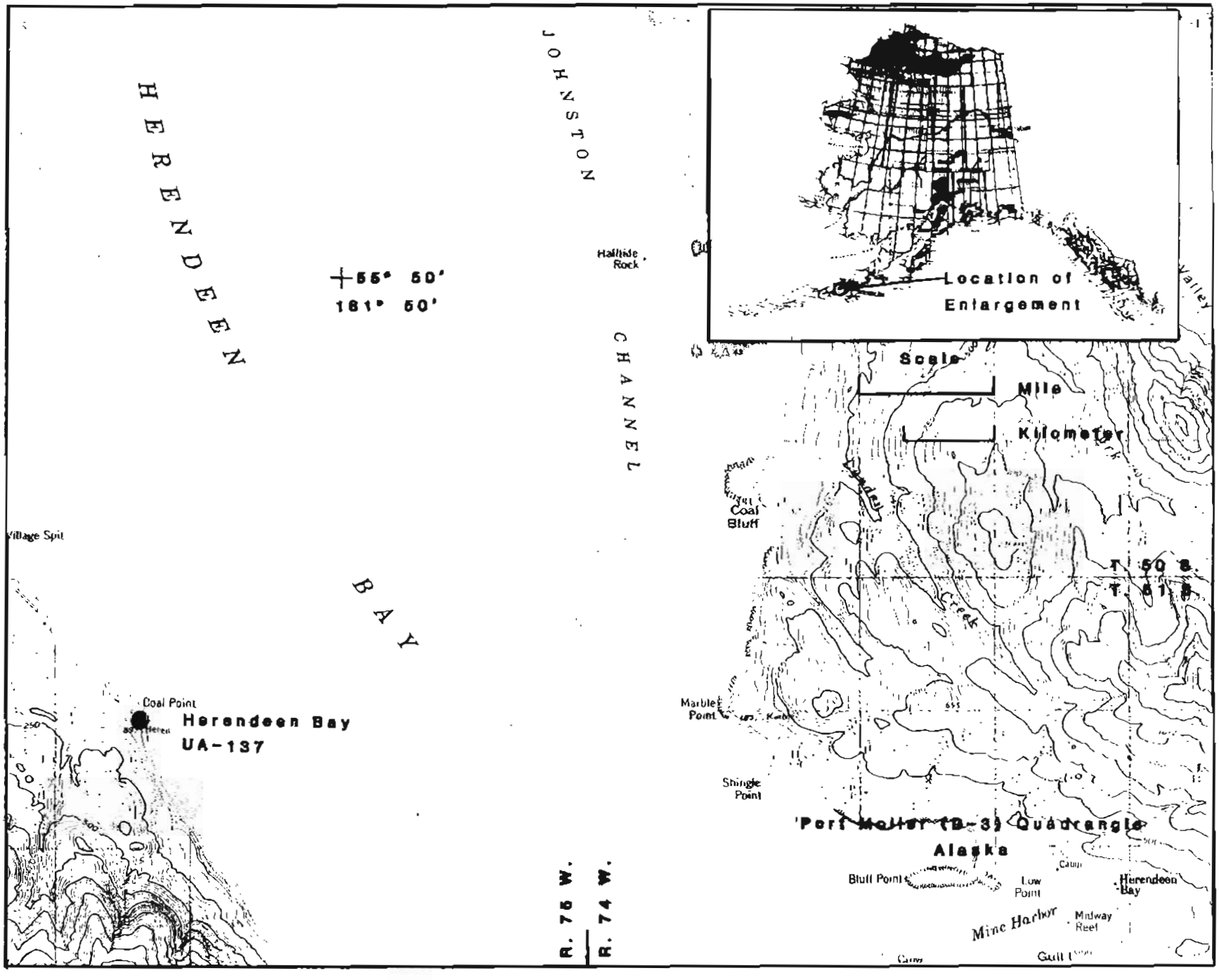


Figure 75. Location of sampling site at the Herendeen Bay field.

Figure 76. View of coal bed exposed at Coal Point on Herendeen Bay.

All float-sink and size analysis products of 65 mesh coal were analyzed for ash, moisture, heating value, total sulfur and pyritic sulfur. All data were calculated on a moisture free basis. The American Society for Testing and Materials (ASTM) standard procedures were used for all analyses.

INTERPRETATION OF WASHABILITY DATA

Tables VIII through LVII show washability data for the fifty samples processed. The tables show weight-percent and heating value distribution, ash, heating value, pyritic sulfur, and total sulfur on a moisture free basis for the various gravimetric fractions as well as values for cumulated floats. The quality of the float at any of the three densities can be directly read from the tables. The tables also show cumulative sink weight-percent and ash content that may be expected at any of the three densities.

These tables also show size distribution of samples pulverized to 65 mesh along with weight-percent distribution, ash, heating value, pyritic sulfur and total sulfur for individual size fractions as well as cumulative on size retained basis.

NORTHERN ALASKA COAL FIELDS

Coal bed No. 7 was sampled in a trench made by the U.S. Bureau of Mines in 1964 by bulldozing. The sample is equivalent to sample 21 of the U.S. Bureau of Mines (Warfield and Boley, 1969) with the exception that the entire seam is sampled and no partings were

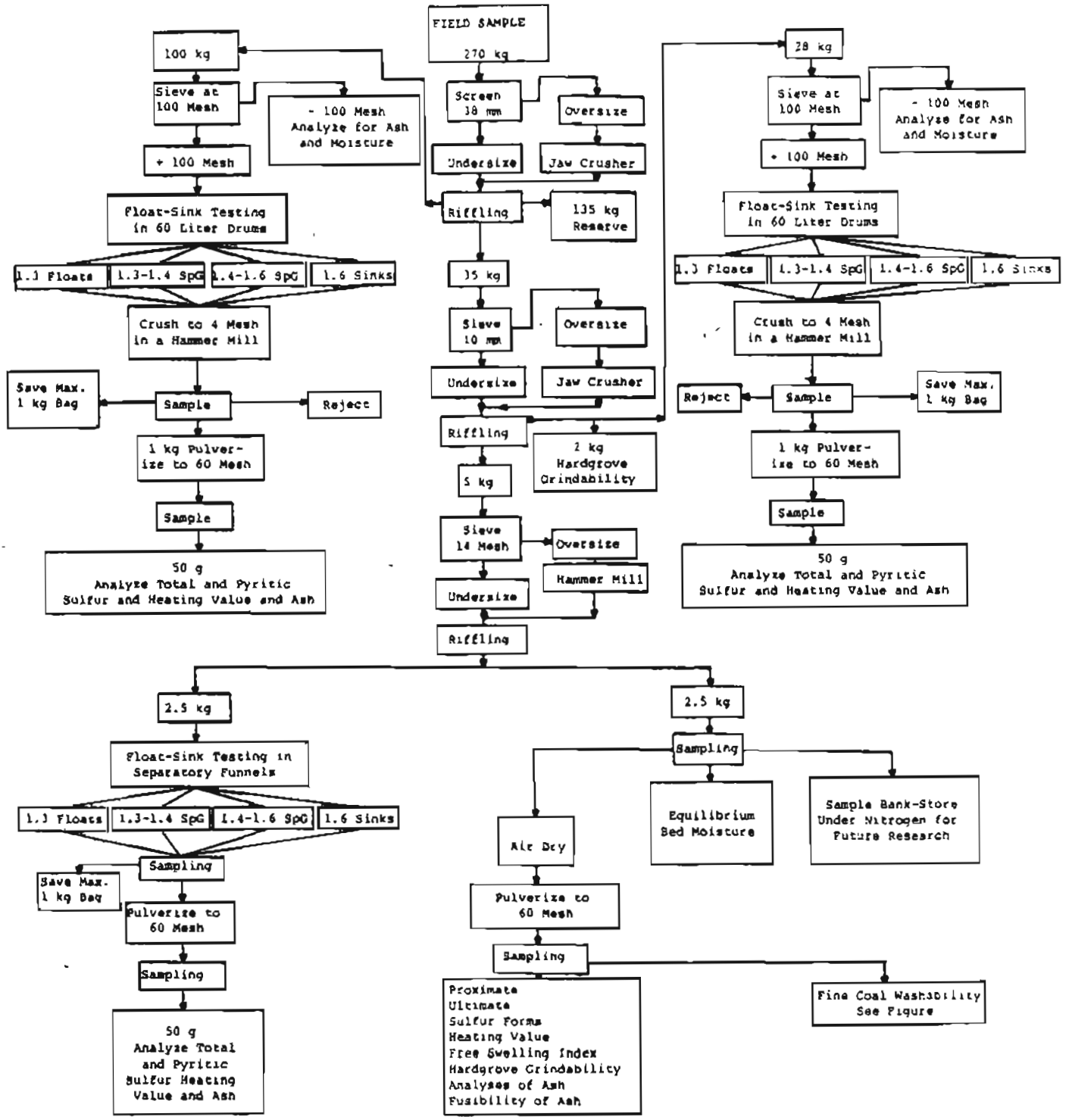


Figure 77. Flowsheet for washability characterization.

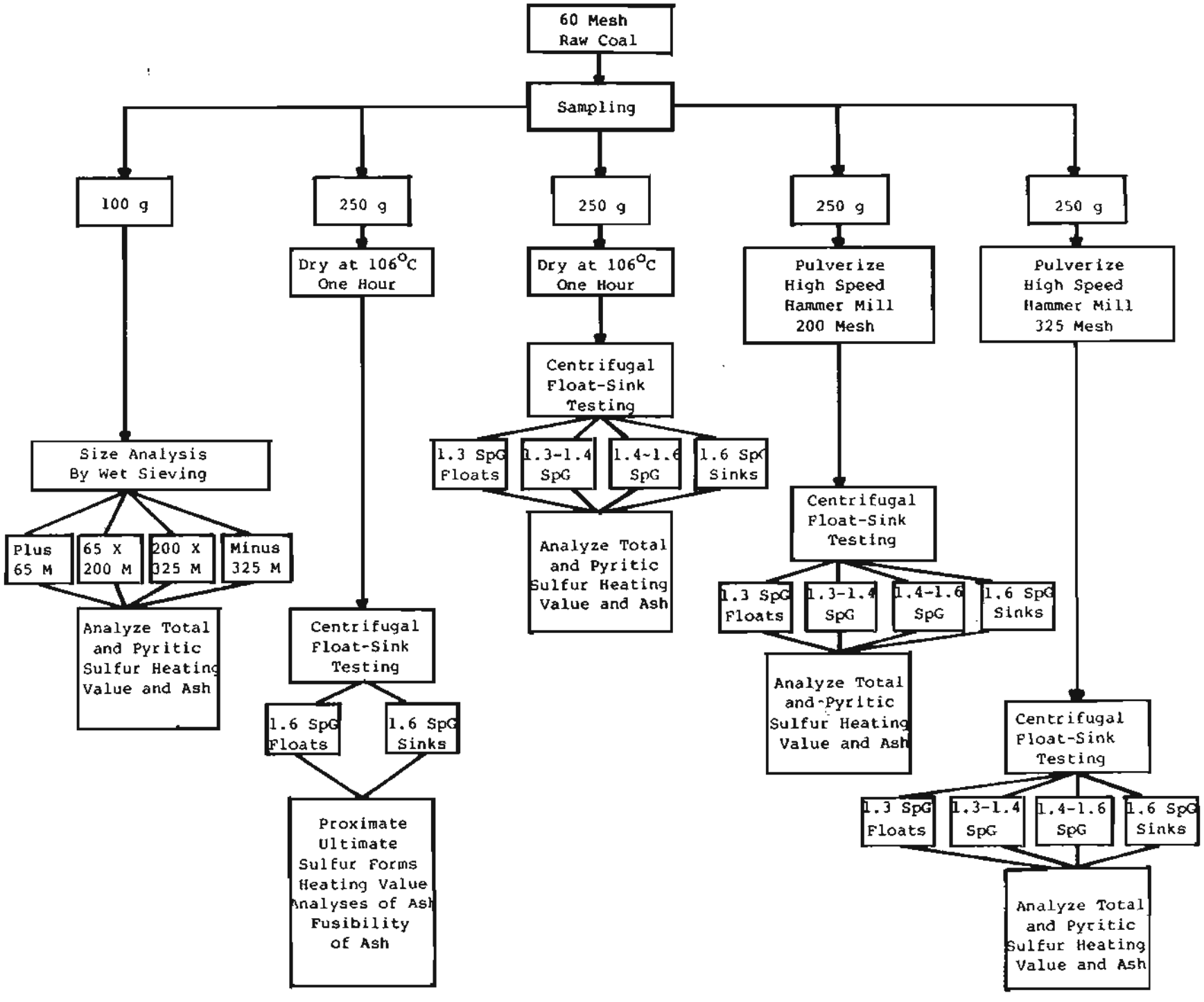
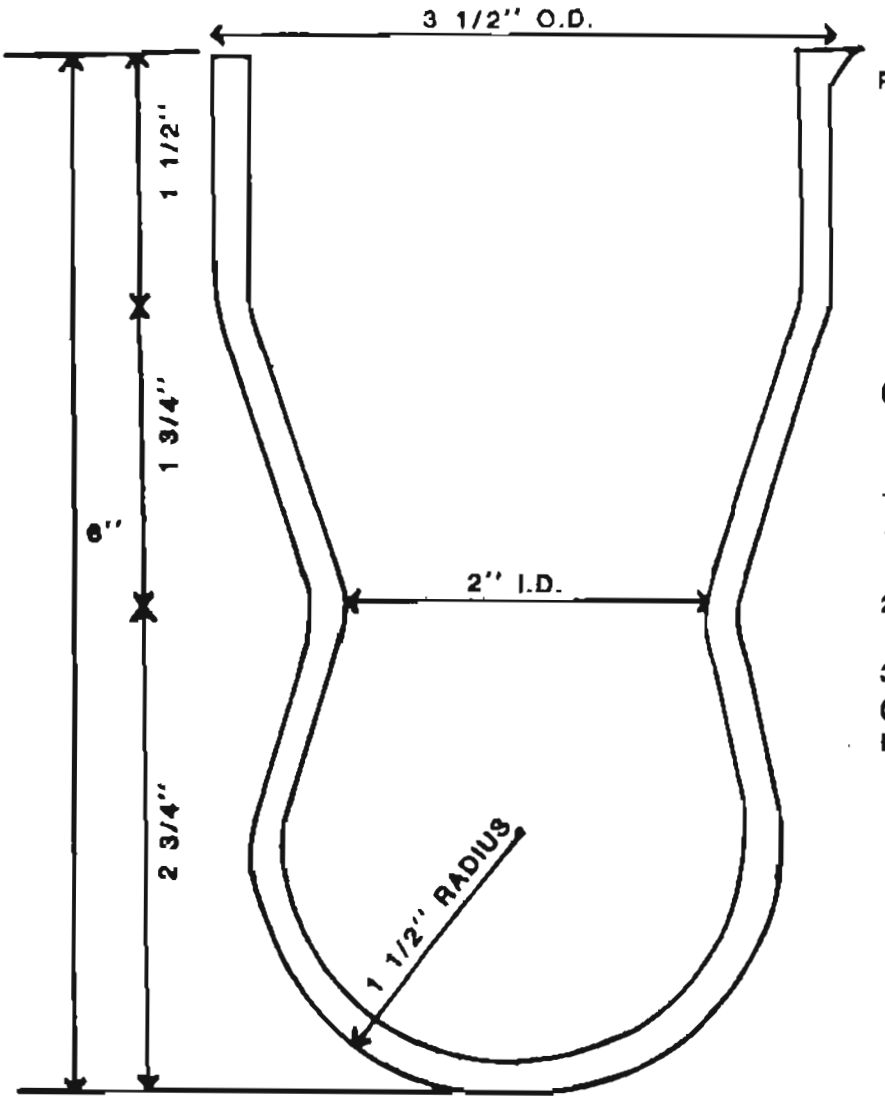


Figure 78. Flowsheet for fine coal washability characterization.



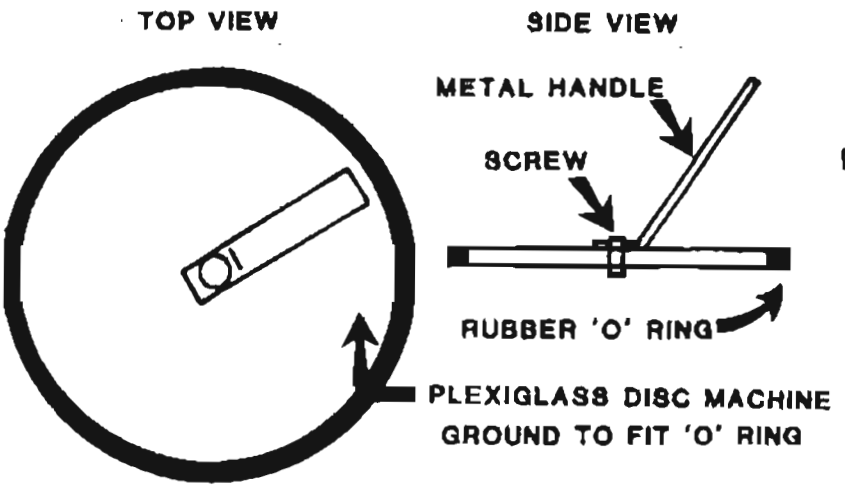


Figure 79. MIRL Design of round-bottom centrifuge bottle

excluded from the sample (UA-139). The vitrinite reflectance of the sample is 0.53 indicating the rank to be high volatile C bituminous. U.S. Bureau of Mines study of a nearby seam showed a loss of >1,000 Btu/lb on a moisture and ash free basis for surface samples compared to fresh samples obtained by drilling (Warfield and Boley, 1969). Although the seam was exposed by trenching, it was close to the surface, and the heating values are lower than those of samples obtained by drilling (Callahan and Martin, 1980). The No. 7 bed coal sample contained 23.8 percent ash and 0.28 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.60 specific gravity gave a product analyzing 11.2 percent ash at 76.2 percent yield (Table XLIV). Washing 65 mesh x 0 coal at 1.60 specific gravity gave a lower ash product containing 8.4 percent ash at 68.4 percent yield. Washing 325 mesh x 0 coal showed further improvement. 1.60 specific gravity float product contained 7.7 percent ash with 67.5 percent yield.

Two coal beds were sampled, representative of coals in the Kokolik-Utukok River district in the national Petroleum Reserve, Alaska. The coal beds in the region have been extensively investigated by the U.S. Geological Survey, under the direction of J.E. Callahan (1980). The study was aided by shallow subsurface data from shot holes, deep exploration wells, and by tracing outcrops buried under the tundra by auger holes. A sure sign of a buried outcrop is the sighting from helicopter of black coal debris dug by ground squirrels (the squirrels find it easier to dig into coal). The auger holes positioned about 50' down dip from the coal debris. Several hundred samples of coals were collected from the region as drill cuttings from seismic shotholes. Auger cuttings, drill cuttings and several deep exploratory wells were sampled, and outcrops and beds were sampled by trenching (Callahan and Martin, 1980). The petrology of three hundred of these samples has been reported by Rao and Smith (1983).

The second bed sampled was from an outcrop on the Kokolik River. In 1964 the U.S. Bureau of Mines excavated the outcrop by hand digging and blasting. For the current investigation, the surface weathered part of the exposure was removed prior to sampling. However, the depth of the cut is not adequate to reach the unoxidized portion of the seam. Vitrinite reflectance was 0.90 percent, placing the rank at high volatile A bituminous.

The Kokolik River sample (UA-126) contained 6.42 percent ash and 0.28 percent sulfur on a moisture free basis. Washing 1-1/2 inch x 100 mesh coal can give a product with 3.6 percent ash and 0.26 percent total sulfur. Washing at 1.40 specific gravity can give 81.3 percent yield with 2.6 percent ash (Table XXXIV). Washing 65 mesh x 0 coal at 1.60 specific gravity gave a product with 2.6 percent ash at a yield of 88.6 percent.

No. 3 coal bed was sampled from an outcrop on Elusive Creek (UA-125). Callahan (1980) traced the bed by seismic shotholes to extend for 5 miles in an east-west direction with slight thinning, whereas it maintains a constant thickness in the north-south direction for a distance of over 2.3 miles (Callahan, 1980, p. 43). Mean maximum reflectance of vitrinite in oil (R_{om}) was 0.71, clearly placing the rank of the coal at high volatile B bituminous. The raw coal is quite low in ash, 2.6 percent and sulfur, 0.31 percent. Washing of 1-1/2 inch x 100 mesh coal at 1.60 specific gravity can reduce ash to 2.1 percent at a yield of 98.7 percent. Washing 14 mesh x 0 coal at 1.60 specific gravity will further reduce ash to 2.0 percent at 98.7 percent yield, whereas washing at 1.40 would provide a product analyzing 1.6 percent ash at 90.5 percent yield (Table XXIII). Washing of 65 mesh x 0 coal at 1.40 specific gravity can reduce ash to as low as 1.1 percent but at a greatly reduced yield of 74.9 percent. Washing at 1.60 specific gravity can, however, give a product containing 1.7 percent ash at 92.1 percent yield.

Coal beds near Wainwright have been known since 1889 (Smith and Mertie, 1930) and have been mined on a small scale. The mined coal is stored in sacks and transported by boat during summer and overland during winter for local use. Although several hundred tons have been mined in the past, current extraction rate is only a few tons a year. There has been increased interest in these coals for possible use in power generation at Wainwright.

This uncorrelated coal bed sample (UA-109) is subbituminous "B" rank and is 5 feet thick. The bottom of the bed was about 4 feet above the Kuk River level in August at the time of sampling. The raw coal sample contained 6.0 percent ash and 0.35 percent total sulfur. This coal was of low ash and low sulfur content as mined, however, crushing to 14 mesh top size and removing the sink 1.60 specific gravity material would provide a product analyzing 2.8 percent ash and 12,167 Btu/lb at a yield of 94.2 percent (Table XVII). Washing 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 2.1 percent ash at 94.5 percent yield.

The No. 2 bed coal sample (UA-110) contained 4.4 percent ash and 0.52 percent total sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.30 specific gravity can give a product with 2.3 percent ash, 0.46 percent total sulfur and 13,155 Btu/lb heating value with 78.4 percent yield. Washing at 1.40 specific gravity can give 96.9 percent yield with 4.1 percent ash. Washing 14 mesh x 0 coal at 1.40 specific gravity will give 89.4 percent yield with 2.1 percent ash (Table XVIII). Washing 65 mesh x 0 coal at 1.60 specific gravity can give a product containing 2.7 percent ash at 97.1 percent yield.

Sagwon Bluffs was sampled to obtain a representative sample of low rank coal in the eastern edge of the Northern Alaska field. The bed is readily accessible from the Trans Alaska Pipeline Haul Road (now the Dalton Highway). This uncorrelated coal bed sample (UA-114) contained 63.2 percent ash, less that 0.1 percent total sulfur and 4,210 Btu/lb. Washing the 3/8 inch top size coal sample at 1.60 specific gravity would reduce the ash to 14.8 percent, upgrade the calorific value to 10,139 Btu/lb, however, the yield would only be 22.8 percent (Table XXII). Washing 65 mesh x 0 coal at 1.60 specific gravity can, however, give a product containing 10.8 percent ash at a yield of 39.9 percent.

NORTHWEST ALASKA COAL FIELDS

Chicago Creek

The uncorrelated bed coal sample from Chicago Creek (UA-138) contained 15.1 percent ash and 0.84 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity can give a product analyzing 8.8 percent ash with 86.7 percent yield. Washing 3/8 inch x 100 mesh at 1.60 specific gravity gave a product with 8.3 percent ash, 10,187 Btu/lb and 0.81 percent sulfur with 90.3 percent yield on a moisture free basis (Table XLIII). Crushing is of no benefit to sulfur reduction since 93 percent of the sulfur is organic. Washing at 65 mesh x 0 coal did not show any improvement in the product quality or yield, partly due to poor dispersion properties of low rank coals in organic heavy liquids.

Unalakleet

Sample (UA-151) from the uncorrelated bed near Unalakleet analyzed 11.2 percent ash and 0.54 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.60 specific gravity gave a product analyzing 7.0 percent ash, 11,328 Btu/lb and 0.60 percent sulfur at 96.0 percent yield (Table LVI). No improvement in quality was observed by washing 65 mesh x 0 coal due to poor dispersion of low rank coal particles in organic liquids.

INTERIOR ALASKA COAL FIELDS

Nenana - Healy Creek

No. 2 Seam (UA-105) is on Healy Creek. This seam is 27.8 feet thick and was mined before the mining of Moose and Caribou seams. The sampled area of the seam was exposed for 2 years prior to sampling. Although the ash content of the raw coal was quite low, 9.5 percent, improvements were made by washing. Minus 14-mesh raw coal washed at 1.40 specific gravity yielded 87.5 percent clean coal with 6.6 percent ash and 0.17 percent sulfur (Table XIII). Washing of 65 mesh x 0 coal at 1.40 specific gravity gave a product containing 5.1 percent ash at 62.4 percent yield.

Lignite Creek

An uncorrelated bed coal outcrop from the Nenana field was sampled (UA-141) on the bluffs along Upper Lignite Creek. The coal bed was from the Suntrana formation although exact correlation to other seams on Lignite Creek was not investigated. The raw coal analyzed 12.8 percent ash and 0.33 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 gave a product analyzing 9.4 percent ash, 10,317 Btu/lb, and 0.35 percent sulfur at 88.6 percent yield. Washing at 1.60 specific gravity gave a product analyzing 11.7 percent ash, with 10,029 Btu/lb at 96.5 percent yield (Table XLVI). Crushing to finer sizes did not show any improvement in product quality and yield. Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 9.9 percent ash at 89.0 percent yield.

Moose Seam and Caribou Seam

Moose seam (UA-103) and Caribou seam (UA-104) are on Upper Lignite Creek. These seams are currently being mined and will continue to be mined for some time. These coals are low in ash and, like all other Nenana coals, are low in total sulfur (0.21 percent for sample UA-103 and 0.23 percent for sample UA-104).

Moose seam (UA-103) is 21.6 feet thick. The sample was quite low in ash, averaging 8.9 percent. Washing of minus 14 mesh coal at 1.40 specific gravity gave a product with 8.0 percent ash at 96.9 percent yield (Table XI). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 6.9 percent ash at 91.4 percent yield. Washing of 200 mesh x 0 and 325 mesh x 0 showed no improvement, principally due to particle dispersion problems.

Caribou seam (UA-104) is 16.6 feet thick and had an ash content of 11.2 percent. Washing minus 14 mesh coal at 1.40 specific gravity yielded 95.6 percent clean coal with 9.7 percent ash and 0.23 percent sulfur (Table XII). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 9.0 percent ash with 95.1 percent yield.

A sample of basal bed (bed A) (Wahrhaftig et al., 1951, p. 164) was obtained from the location of former Arctic Coal Company operations (UA-140). The bed is 45 feet thick at the sampling location, and has an average thickness of 30 feet (Wahrhaftig et al., 1951). Raw coal analyzed 19.5 percent ash and 0.38 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity gave a product analyzing 10.2 percent ash, and 10,671 Btu at 73.8 percent yield. Washing at 1.60 specific gravity will give a product with 13.5 percent ash, and 10,179 Btu/lb with 90.5 percent yield (Table XLV). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 12.3 percent ash at 79.4 percent yield.

Samples of No. 1 bed coal (UA-129) and No. 3 bed coal (UA-130) were collected from the Lower Lignite Creek, Poker Flat Pit, Usibelli Coal Mine. The coals are subbituminous C rank. No. 1 bed is not being mined at this time and is the lowest bed in the Suntrana formation. The raw coal analyzed 17.3 percent ash and 0.21 percent sulfur on a moisture free basis. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity gave 83.4 percent yield with 10.0 percent ash, and 10,858 Btu/lb. Washing at 1.60 specific gravity gave 93.7 percent yield with 12.3 percent ash and 10,531 Btu/lb (Table XXXVII). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 9.5 percent ash at 80.3 percent yield.

No. 3 bed (UA-130) is the lowest of the three beds being mined by Usibelli Coal Mine, and is the lowest of the seams extractable at this time. The raw coal contained 12.5 percent ash and 0.22 percent sulfur on a moisture free basis. Washing the coal at 1.6 specific gravity gave a 91.8 percent yield with 6.9 percent ash, 0.13 percent sulfur and 10,774 Btu/lb on a moisture free basis (Table XXXVIII). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 5.4 percent ash at 93.8 percent yield.

A sample of the No. 4 bed coal (UA-119) was collected from the Lower Lignite Creek, Poker Flat pit, of the Usibelli Coal Mine and is the middle seam of the three extractable seams in the mining area. Overburden of this bed was first stripped during the summer of 1977 and the bed was mined for the first time in 1978. This bed has the largest mineable reserves of the three seams, No. 6, No. 4 and No. 3. The raw coal analyzed 13.2 percent ash and 0.44 percent total sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity (Table XXII) gave a 96.8 percent yield with 9.5 percent ash and 0.28 percent total sulfur on a moisture free basis. Pyritic sulfur in the sample is low and washing will not have any significant influence on the sulfur. Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 7.3 percent ash at 90.2 percent yield.

Poker Flat Pit

Poker Flat Pit, now being developed for mining using a new dragline, will supply all coal requirements for Fairbanks and Interior Alaska for the near future. This pit is on Lower Lignite Creek. The sampled seam is No. 6 seam and is 24.8 feet thick. The top and bottom portions of the seam are high in ash, with as possible need for washing; the middle portion is low in ash and can be shipped directly. For this reason, the seam was sampled in three portions and the coal was processed in the laboratory as three independent samples. As with all coals from the Nenana coal field, these samples showed low total sulfur (< 0.2 percent) and barely detectable pyritic sulfur (0.01 percent); thus, physical beneficiation did not reduce the sulfur content in the coal, since all sulfur is organically bound to the coal substance.

Sample UA-100 was obtained from the top 3.3 feet of the seam and contained an average of 20.9 percent ash. Washing this coal at 1.40 specific gravity and 14 mesh top size, yielded 51.7 percent as clean coal with 11.4 percent ash, 0.18 percent sulfur and 10,413 Btu/lb on a moisture free basis (Table VIII). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product analyzing 14.3 percent ash at 69.9 percent yield.

Sample UA-101 was obtained from the middle 18.3 feet of the seam and had an ash content of 9.4 percent. Cleaning the 14 mesh x 0 coal at 1.40 specific gravity gave a product with 8.6 percent ash and 0.15 percent sulfur with a heating value of 10,767 Btu/lb on a moisture free basis (Table IX). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product with 7.7 percent ash at 92.1 percent yield.

Sample UA-102 was obtained from the bottom 3.3 feet of the seam and averaged 13.5 percent ash. Washing minus 14 mesh coal at 1.40 specific gravity reduced the ash content to 12.5 percent with 93.4 percent yield (Table X). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 11.9 percent ash at 91.5 percent yield.

The uncorrelated bed coal outcrop on Marguerite Creek west of Jumbo Dome was sampled (UA-120). This area of the Nenana coal field is undeveloped. Amax Coal Company has done preliminary coal exploration. The coal is subbituminous C rank and has 12.0 percent ash and 0.15 percent sulfur on a moisture free basis. Washing of 1-1/2 inches x 100 mesh material at 1.40 specific gravity gave a product with 8.3 percent ash, 0.12 percent sulfur and 10,535 Btu/lb on a moisture free basis at a yield of 82.9 percent. Washing at 1.60 specific gravity gave 96.9 percent yield with 10.8 percent ash and 10,171 Btu/lb (Table XXVIII). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 7.5 percent ash at 82.1 percent yield.

Coal was mined at the Yanert mine until 1924. The mine is located in Denali National Park (formerly Mt. McKinley National Park). The coal (UA-132) has a vitrinite reflectance of 0.76 (R_{om}) indicating that unweathered coal shows a high volatile "B" bituminous rank. The raw coal analyzed 54.6 percent ash and 0.19 percent sulfur on a moisture free basis. Washing 1-1/2 inches x 100 mesh coal at 1.60 specific gravity gave a product with 18.6 percent ash at 35.3 percent yield. Washing 3/8 inch x 100 mesh coal at 1.60 specific gravity gave an improved product with 14.2 percent ash at 37.6 percent yield on a moisture free basis (Table XL). Washing of 65 mesh x 0 coal at 1.40 specific gravity gave a product containing 4.2 percent at 15.6 percent yield.

Jarvis Creek

The Jarvis Creek coal field has been mined sporadically for a number of years on a very small scale.

The No. 1 seam (UA-106) is of primary interest. It is exposed on Ober Creek and is 10 feet thick. It was sampled in an open pit off Ober Creek. The ash content of 14 mesh x 0 raw coal was 11.1 percent on a moisture free basis and could be upgraded by washing at 1.40 specific gravity to give a product containing 9.4 percent ash, 0.98 percent sulfur and 84.9 percent yield on a moisture free basis. The sulfur content of this seam is unusually high for an Alaskan coal, i.e., 1.20 percent. About a third of this sulfur is pyritic sulfur. Only the lowest specific gravity fraction, i.e., 1.30, showed low pyritic sulfur (Table XIV). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 9.0 percent ash at 93.1 percent yield.

Eagle

Two coal seams were sampled from this field, both from an area with a history of established placer gold mining activity.

A coal bed sampled from Coal Creek (UA-121) had vitrinite reflectance of 0.44 (R_{om}). This places the rank of coal at subbituminous B and the low heating value (7,616 Btu/lb) of the coal is attributable to the severely oxidized condition of the outcrop sample. The raw coal sample contained 23.0 percent ash and 0.61 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity can give 22.0 percent yield with 9.6 percent ash. Washing at 1.60 specific gravity can improve yield to 82.7 percent with 13.7 percent ash

(Table XXIX). Washing at finer sizes did not indicate any additional improvement in yield or ash content of the products. Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 10.5 percent ash at 59.5 percent yield.

The uncorrelated coal bed sample (UA-124) from Chicken was from a weathered outcrop. The vitrinite reflectance (R_{om}) was 0.36 percent equivalent to subbituminous C rank. The sample contained 27.5 percent ash and 1.41 percent sulfur on a moisture free basis. Washing 1-1/2 inches x 100 mesh at 1.30 specific gravity gave 40.7 percent yield with 10.0 percent ash and 1.35 percent sulfur. This is one of the few high sulfur coals in Alaska. Very little of the sulfur is in pyritic form and thus no reduction in sulfur is possible by washing (Table XXXII). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product containing 9.5 percent ash and 1.27 percent sulfur at 54.0 percent yield.

Nulato

An uncorrelated thin bed of coal was sampled from a location ten miles upstream from Nulato, along the north bank of the Yukon River. The seam varied in thickness from six to eighteen inches and pinched out within 10 feet of the sampled exposure. The seam was still included in the program since a better seam could not be located, and the sample would give an indication of the quality and rank of the coal in this field. The raw coal sample (UA-128) contains 65.4 percent ash and 0.38 percent sulfur. The coal is high volatile A bituminous rank with vitrinite reflectance of 0.88% (R_{om}). Washing 1-1/2 inches x 100 mesh coal can give 16.4 percent yield with 6.9 percent ash, 0.94 percent sulfur and 13,672 Btu/lb heating value (Table XXXVI). Washing 65 mesh x 0 coal at 1.40 specific gravity gave a product containing 6.4 percent ash at 22.3 percent yield.

More extensive geological exploration is needed to uncover seams of economic value, which would be of particular significance to the village of Nulato and other communities along the Yukon River now burdened with the high cost of liquid fuels.

Tramway Bar

Coal at the Tramway Bar occurrence has been used locally by gold miners on a very small scale. The uncorrelated coal bed sample (UA-117) has several thin refuse bands that contribute to the 38.2 percent ash contained in the raw coal. The raw coal has low total sulfur, 0.15 percent and very low pyritic sulfur. Washing the 1-1/2 inches x 100 mesh material at 1.60 specific gravity will give a product with 11.5 percent ash and 0.27 percent total sulfur and 11,523 Btu/lb heating value at a yield of 46.8 percent (Table XXV). Washing 65 mesh x 0 coal at 1.60 specific gravity gave a products with 8.4 percent ash at 48.1 percent yield.

Beluga

There are two mineable coal beds in the Capps basin, the Lower Waterfall bed and Upper Capps bed.

The Waterfall bed has been well drilled and delineated by the lease holder, Beluga Coal Company. The sample (UA-113) collected represents the lower 30 feet of the seam. The top 6 feet is very dirty and is sampled separately (UA-148). The raw coal (UA-113) is quite low in ash, and sulfur 10.2 percent and 0.18 percent, respectively, on a moisture free basis. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity gave a product with 7.2 percent ash, 0.20 percent total sulfur, and 11,222 Btu/lb at a yield of 92.7 percent. Crushing to 3/8 inch and 14 mesh top size followed by float-sink testing did not show any further im-

provement in the quality of the product (Table XXI). Washing of 65 mesh x 0 coal at 1.60 specific gravity, however, gave a product containing 6.5 percent ash at 95.0 percent yield.

The top 6 feet of the seam (UA-148) is high in ash principally due to a twelve inch thick clay parting. The raw coal contained 38.5 percent ash and 0.26 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity gave a product analyzing 9.4 percent ash, 10,598 Btu/lb and 0.28 percent sulfur with 39.3 percent yield (Table LIII). Crushing to 3/8 inch top size and separating at 1.60 specific gravity would provide a 59.2 percent yield of coal analyzing 13.2 percent ash, 9,902 Btu/lb and 0.29 percent sulfur. Washing of 65 mesh x 0 coal at 1.40 specific gravity gave a product containing 6.3 percent ash at 30.6 percent yield.

The Upper Capps bed sample (UA-127) contained 14.8 percent ash and 0.22 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity gave a product analyzing 8.0 percent ash, 10,658 Btu/lb and 0.19 percent sulfur with 72.7 percent yield. Washing at 1.60 specific gravity gave a product with 12.3 percent ash and 94.0 percent yield on a moisture free basis (Table XXXV). Washability results of 65 mesh x 0 coal did not prove to be beneficial.

The Green bed (UA-152) was sampled from a test pit excavated by Placer Amex, Inc. to obtain an 1,800 ton bulk sample for shipment to Japan. The coal has a low ash content and washing can make only slight improvement. Washing of 1-1/2 inches x 100 mesh coal gave a product analyzing 5.3 percent ash, 11,338 Btu/lb, and 0.17 percent sulfur at a yield of 98.5 percent. Washing 3/8 inch x 100 mesh coal at 1.60 specific gravity gave a product analyzing 5.8 percent ash at a yield of 97.9 percent on a moisture free basis (Table LVII). The raw coal sample analyzed 8.2 percent ash and 0.16 percent total sulfur. Washability results of 65 mesh x 0 coal showed that finer grinding would not be beneficial.

Yentna

The coal bed sampled (UA-149) along Johnson Creek is the thickest of three beds outcropping. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity gave a product analyzing 8.5 percent ash, 10,782 Btu/lb and 0.26 percent sulfur at 79.2 percent yield. Washing at 1.60 specific gravity gave a product analyzing 11.6 percent ash and 10,307 Btu/lb at a yield of 93.5 percent. Crushing to a smaller size improved the ash content of the product. Washing 3/8 inch x 100 mesh coal at 1.60 specific gravity gave a product analyzing 10.2 percent ash, 10,499 Btu/lb and 0.23 percent sulfur at a yield of 93.9 percent on a moisture free basis (Table LIV). The raw coal sampled analyzed 13.7 percent ash and 0.24 percent sulfur.

Washability results of coal pulverized to 65 mesh, 200 mesh and 325 mesh gave poorer results due to difficulties dispersing the coal particles in organic heavy liquids used.

The coal bed sampled at Canyon Creek (UA-150) is the upper of the two seams in the sedimentary sequence. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity gave a product analyzing 9.8 percent ash, 10,951 Btu/lb and 0.18 percent sulfur at a yield of 71.2 percent. Washing at 1.60 specific gravity gave a product analyzing 13.7 percent ash at 92.1 percent yield. Crushing to a finer size improved the quality of the product. Washing 3/8 inch x 100 mesh at 1.40 specific gravity gave a product analyzing 7.7 percent ash with a yield of 73.0 percent and 11,179 Btu/lb on a moisture free basis. The raw coal sample analyzed 18.8 percent ash and 0.17 percent sulfur. Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product analyzing 10.0 percent ash at 80.5 percent yield (Table LV).

The uncorrelated bed coal outcrop at Locality 2 (Barnes) was sampled in two sections, the lower 10 feet (UA-115) and the upper 10 feet (UA-116). The total bed is 67 feet thick. The coal has no visible bands of shale and is uniform in appearance. The ash and sulfur in both of the samples is very low. Table XXIII shows washability analysis for UA-115, the lower 10 feet of the seam, which is quite clean, containing 4.7 percent ash and 0.15 percent total sulfur. The washability analysis for the upper 10 feet of the bed is shown in Table XXIV, and UA-116 is better coal than UA-115, containing 3.6 percent ash and 0.11 percent total sulfur. Cleaning of these coals would be of minimal benefit.

Kenai

Numerous coal beds are exposed on the beach cliffs along the western shore of the Kenai Peninsula. Coal was and is mined near Homer on a small scale for domestic use. There is no coal mining in the Kenai field at this time.

The Cabin Bed sample (UA-118) is one of the numerous beds exposed on the beach cliffs near Homer and was mined on a small scale. The bed does not have any visible refuse bands at the sample location. Raw coal has 11.2 percent ash and 0.30 percent total sulfur on a moisture free basis. The coal has only traces of pyritic sulfur. Washing the 1-1/2 inches x 100 mesh material at 1.40 specific gravity gave a product analyzing 8.5 percent ash and 0.43 percent total sulfur with a yield of 89.3 percent. Washing 3/8 inch x 100 mesh coal at 1.40 specific gravity will give 90.8 percent yield with 8.3 percent ash and 0.48 percent total sulfur on a moisture free basis (Table XXVI). Washability testing of 65 mesh x 0 coal showed that the particles were not totally dispersed.

A coal bed was sampled about a mile northeast of Ninilchik (UA-122). A natural cave is formed on the beach due to differential erosion of sediments underlying the coal seam by the action of the waves. Approach to the sampling site is through Ninilchik and along the beach by truck. The coal is subbituminous "C" rank and has 17.4 percent ash and 0.33 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity will give a product with 8.2 percent ash, 10,684 Btu/lb, and 0.28 percent sulfur with a yield of 63.3 percent. Crushing to 14 mesh and washing at 1.60 specific gravity gave an acceptable product with 10.6 percent ash at a yield of 85.0 percent on a moisture free basis (Table XXX). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave product analyzing 8.5 percent ash at 72.5 percent yield.

A coal sample was obtained from an outcrop on Happy Creek along the beach bluff (UA-131). The raw coal had 12.6 percent ash and 0.38 percent sulfur. Washing at 1.40 specific gravity gave a product with 9.0 percent ash, 11,074 Btu/lb and 0.39 percent sulfur with 86.8 percent yield on a moisture free basis. Washing coal crushed to 14 mesh at 1.60 specific gravity gave a product with 10.0 percent ash while improving the yield to 95.0 percent (Table XXIX). The advantages of crushing to a finer size for ash reduction are obvious. Washability data for 65 mesh x 0 coal showed that the coal particles are poorly dispersed.

Matanuska

Big Seam (UA-108) was collected from the Premier Mine which is the only mine in this coal field that has produced coal since 1968. Paul Ohmlin mined on a small scale to supply a domestic market. One sample was collected from an area where mining has been done within a year prior to sample collection. Since the area was highly deformed, the seam thickness could not be determined, and the sample is not necessarily a true channel sample. The raw coal averaged 15.1 percent ash and could be upgraded to 5.1 percent ash by washing

minus 14 mesh coal at 1.40 specific gravity, giving a 75.3 percent yield. The coal was low in total sulfur (0.37 percent). Pyritic sulfur was very low (0.02 percent) and physical beneficiation did not significantly reduce the total sulfur content (Table XVI). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave product analyzing 6.1 percent ash at 81.5 percent yield.

Six beds of coal were sampled from the former strip mine pit of the Evan Jones mine. The Evan Jones coal mine was operated as an underground coal mine from 1920 until 1959 when all mining was done by surface mining. The mine ceased operations altogether in 1968 when the Anchorage area converted to natural gas as a source of energy. Geer and Yancey (1946) of U.S. Bureau of Mines conducted washability studies on various seams in the coal field. Coal at the Evan Jones mine was washed using a Forrester-type jig from the early 20's until a heavy media plant was installed in the early 50's. Fine coal was cleaned with tables. Washability studies of Geer and Yancey were instrumental in working out the specific gravity settings for the heavy media circuit to obtain maximum recoveries while meeting desired specifications (Tucker, 1968).

In 1966 Rao sampled all seams mined at Evan Jones mine (Rao, 1975). The present washability program is intended to provide more complete information on the washability and raw coal characteristics of the remaining portion of the seams likely to be mined in the future. The ash-yield results of the present study reinforced the conclusion of earlier studies (Greer and Fennessy, 1962, p. 7) that it is possible to make a premium quality product by washing at 1.40 specific gravity while producing a middling product from 1.40 to 1.60 specific gravity fraction.

The raw coal sample collected from the No. 7A coal bed, Matanuska field analyzed 19.2 percent ash and 0.42 percent sulfur. Coal (1-1/2 inches x 100 mesh) from No. 7A bed was washed at 1.40 specific gravity (UA-142). This gave a product analyzing 4.1 percent ash; 13,561 Btu/lb and 0.29 percent sulfur at 67.0 percent yield. The 1.40 to 1.60 specific gravity middling product will analyze 26.6 percent ash and 10,295 Btu/lb at 15.2 percent yield. Crushing to a finer size improved the ash content even more. Washing 14 mesh x 0 coal at 1.40 specific gravity gave a product analyzing 3.3 percent ash at 64.5 percent yield. The 1.4 to 1.6 middling product coal analyzed 23.8 percent ash, 10,393 Btu/lb at a ;yield of 11.7 percent (Table XLVII). Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product analyzing 5.5 percent ash at 77.6 percent yield. Washing 200 mesh x 0 coal, however, gave a product analyzing 5.1 percent ash at 77.2 percent yield.

Washing 1-1/2 inches x 100 mesh coal from No. 7 Lower bed coal (UA-143) at 1.4 specific gravity gave a product analyzing 5.0 percent ash, 13,686 Btu/lb and 0.40 percent sulfur with a yield of 66.2 percent. The middling product at 1.40 to 1.60 specific gravity analyzed 25.9 percent ash at 17.4 percent yield. Washing at finer sizes showed reduction in ash in the product (Table XLVIII). The raw coal sample analyzed 17.7 percent ash and 0.45 percent sulfur. Washing of 65 mesh x 0 coal at 1.60 specific gravity gave a product analyzing 7.1 percent ash at 78.2 percent yield.

Coal, 1-1/2 inches x 100 mesh from No. 7 Upper bed (UA-144) was washed at 1.40 specific gravity, giving a product analyzing 5.6 percent ash, 13,448 Btu/lb, and 0.36 percent sulfur at 63.8 percent yield. The 1.40 to 1.60 specific gravity middling product will analyze 26.3 percent ash, with a heat content of 10,116 Btu/lb at 28.8 percent yield. Washing at finer sizes improved the ash content of the products (Table XLIX). The raw coal sample analyzed 16.7 percent ash and 0.45 percent sulfur. Washing of 65 mesh x 0 coal at 1.40

specific gravity gave a product analyzing 3.2 percent ash at 50.8 percent yield, whereas washing at 1.60 specific gravity gave a product analyzing 7.8 percent ash with 73.7 percent yield.

Washing 1-1/2 inches x 100 mesh No. 6 Lower bed (UA-145) coal at 1.40 specific gravity gave a product analyzing 5.8 percent ash, 13,298 Btu/lb and 0.28 percent sulfur at yield of 67.7 percent. The 1.40 to 1.60 specific gravity middling product will analyze 25.2 percent ash and 10,140 Btu/lb at 13.8 percent yield. Washing at finer sizes reduced the ash in the products even further (Table L). The raw coal sample analyzed 20.0 percent ash and 0.37 percent sulfur. Washing of 65 mesh x 0 coal at 1.40 specific gravity gave a product analyzing 4.3 percent ash at 59.8 percent yield.

The No. 6 Upper bed (UA-146) and No. 5 bed (UA-147) were more difficult to clean and will produce far less premium quality products, and only at finer sizes.

Washing 1-1/2 inches x 100 mesh No. 6 Upper bed (UA-146) coal at 1.40 specific gravity gave a product analyzing 8.5 percent ash, 12,847 Btu/lb and 0.39 percent sulfur at 44.8 percent yield. Washing 14 mesh x 0 coal at 1.40 specific gravity, however, gave a better product analyzing 6.6 percent ash, 13.231 Btu/lb and 0.39 percent sulfur at 30.2 percent yield. The 1.40 to 1.60 specific gravity middlings analyzed 21.3 percent ash and 10,769 Btu/lb at 30.5 percent yield (Table LI). The raw coal sample analyzed 31.2 percent ash and 01.37 percent sulfur. Washing of 65 mesh x 0 coal at 1.40 specific gravity gave product analyzing 5.3 percent ash at 37.3 percent yield.

Washing 1-1/2 inches x 100 mesh No. 5 bed (UA-147) coal at 1.40 specific gravity gave a product analyzing 7.6 percent ash, 13,129 Btu/lb and 0.34 percent sulfur at 33.7 percent yield. Washing 14 mesh x 0 coal at 1.40 specific gravity, however, gave a product analyzing 5.3 percent ash, 13,879 Btu/lb and 0.31 percent sulfur. The 1.40 to 1.60 specific gravity middlings analyzed 22.6 percent ash, 10,672 Btu/lb at 21.8 percent yield (Table LII). The raw coal sample analyzed 35.9 percent ash and 0.26 percent sulfur. Washing 65 mesh x 0 coal at 1.40 specific gravity gave a product analyzing 5.1 percent ash at 43.4 percent yield. Washing 325 mesh x 0 coal 15 1.40 specific gravity, however, gave a product analyzing 4.9 percent ash at 45.4 percent yield.

All seams sampled from the Evan Jones mine have only traces of sulfur in pyritic form and washing, therefore, will not influence the already low total sulfur in the washed product.

Lower Seam (UA-107) was mined in this area in the early 1960's, but mining has been discontinued due to lack of knowledge of the continuity of the beds. The sample was collected from an open pit with two exposed seams. It was obtained from the lower bed, which is 7 feet thick, and is probably the best known coking coal in Alaska with a free-swelling index of 8. The raw coal had 19.0 percent ash and 0.45 percent sulfur. Pyritic sulfur in this coal was low (0.05 percent) and washing would not reduce it. However, washing minus 14 mesh coal at 1.40 specific gravity reduced the ash to 7.6 percent with 65.7 percent yield (Table XV). Washing of 65 mesh x 0 coal at 1.40 specific gravity gave product analyzing 4.7 percent ash at 69.3 percent yield.

Broad Pass

Coal was mined in the Coal Creek basin during 1920 to 1921 by Coal Creek Mine. A 2-1/2 mile wagon road was used for transportation to Broad Pass station and was sold to the Alaska Railroad Co. during its construction (Keller et al., 1961). Completion of the

construction marked the end of mining due to lack of other markets. This was a sample of Coal Creek bed coal (UA-111) and is lignite in rank. The raw coal has 19.6 percent ash and washing 1-1/2 inches x 100 mesh coal at 1.40 specific gravity will give a product containing 11.4 percent ash, 9,939 Btu/lb heating value and 0.22 percent total sulfur, with 82.2 percent yield on a moisture free basis (Table XIX). Washing of 65 mesh x 0 coal at 1.40 specific gravity will give a product analyzing 8.7 percent ash at 79.0 percent yield.

Coal production from this field to meet local needs dates back to 1929. Production has increased with the transfer of a coal prospecting permit to W.E. Dunkle in 1941. In the period 1940-54 about 64,000 tons of coal were produced. Mr. Dunkle installed a prototype reactor for steam drying of coal from Dunkle Mine and shipped twenty tons of processed coal to the Fairbanks Exploration Company power plant in 1958 for testing, and that appears to be the last reported activity of the mine. The Dunkle bed sample (UA-123) had 15.6 percent ash and 0.44 percent sulfur. Washing the 1-1/2 inches x 100 mesh coal at 1.60 specific gravity gave 87.9 percent yield analyzing 9.0 percent ash, 12,016 Btu/lb and 0.46 percent sulfur. Crushing to 14 mesh and washing at 1.60 specific gravity will give a product analyzing 7.8 percent ash, 12,218 Btu/lb, with 87.1 percent yield (Table XXXI). Washing of 65 mesh x 0 coal at 1.40 specific gravity will give a product analyzing 6.3 percent ash at 85.2 percent yield.

Little Tonzona

The raw coal was a sample of the Tonzona coal bed (UA-112) and has 13.8 percent ash and 1.40 percent of sulfur. The sulfur is unusually high for Alaskan coals. The only other seam of those studied that had a sulfur content more than 1 percent was the mine seam in the Jarvis Creek field (UA-106). Pyritic sulfur in the Little Tonzona coal bed is low and washing will not reduce the sulfur content of the product. Washing the 1-1/2 inches x 100 mesh coal at 1.40 specific gravity will give 83.4 percent yield with 8.9 percent ash and 10,539 Btu/lb heating value on a moisture free basis. Separation at 1.60 specific gravity, however, will increase the yield to 96.7 percent with ash content reduced to only 11 percent. Crushing to 3/8 inch and 14 mesh top size did not result in significant additional liberation of impurities (Table XX). Washability results of 65 mesh x 0 coal gave poor results due to incomplete dispersion of coal particles.

ALASKA PENINSULA

Chignik Field

The coal seam from the Chignik Bay coal mine (UA-136) was sampled at the entrance to the tunnel. The mine was abandoned nearly 70 years ago. The sample contained 36.2 percent ash and 1.12 percent sulfur. Washing 1-1/2 inches x 100 mesh coal at 1.60 specific gravity gave a product that contained 11.0 percent ash, 12,340 Btu/lb and 1.9 percent sulfur with 50.2 percent yield (Table XLI). Although half of the total sulfur is in pyritic form, reduction in sulfur by washing at a finer size was only moderate. Washing of 65 mesh x 0 coal at 1.60 specific gravity gave product analyzing 9.3 percent ash at 50.3 percent yield.

Herendeen Bay

An uncorrelated coal bed outcropping on the west bank of Herendeen Bay was sampled (UA-137). The seam was only about 12" thick and was chosen due to practical considerations of ready access and transportability of bulk sample. Thicker coal beds, inland from the east shore of the Bay were mined at the turn of the century. Conwell and Triplehorn (1978) measured nine coal beds at Mine Harbor ranging from 1.5 feet to more than 5 feet. Vitrinite reflectance of the sampled bed (UA-137) was 0.63 indicating the rank to be about high

volatile B bituminous. The raw coal analyzed 43.6 percent ash and 1.91 percent sulfur. Washing the 1-1/2 inches x 100 mesh material at 1.40 specific gravity will give a product analyzing 9.9 percent ash, 12,841 Btu/lb and 1.59 percent sulfur at 31.8 percent yield. Crushing to a finer size resulted in further reduction in ash and total sulfur. Washing 14 mesh x 0 material at 1.40 specific gravity will give a product with 7.1 percent ash, 13,244 Btu/lb and 1.03 percent sulfur at 29.3 percent yield (Table XLII). Washing of 65 mesh x 0 coal at 1.40 specific gravity gave a product analyzing 5.8 percent ash at 64.1 percent yield.

CONCLUSIONS

Washability studies showed that No. 7 seam from the Cape Beaufort region of the Northern Alaska field can be washed to give a product containing 11.2 percent ash.

Coals from Elusive Creek and Kokolik River can be cleaned to produce premium quality products containing less than 2 percent ash and 0.25 percent sulfur.

Coals from Wainwright can be cleaned to less than 2.5 percent ash and with sulfur as low as 0.24 percent for Wainwright and 0.46 percent for Meade River coals.

Coal from Chicago creek can be washed to give a product containing 8.3 percent ash.

Coal from Unalakleet can be washed to give a product containing 7.0 percent ash. Subbituminous "C" coal from the Basal bed can be washed to give a product containing 10.2 percent ash.

Subbituminous C coal from the Nenana coal field could be upgraded at high yield to produce low sulfur products ranging from slightly over 10,000 to nearly 12,000 Btu/lb on a moisture free basis.

The coal bed on Marguerite Creek contains 11.95 percent ash and can be washed to give a product containing 7.5 percent ash when crushed to 65 mesh.

The coal bed from the Yanert mine has 54.6 percent ash. Cleaning will give poor yield at higher than acceptable ash levels in the product.

The mine seam subbituminous C coal sample obtained from the Jarvis Creek coal field had an unusually high total sulfur content; 1.28 percent. However, appropriate crushing and gravimetric separation could yield a 1 percent sulfur product.

Subbituminous "B" coal from Coal Creek can be washed to give a product less than 10.0 percent ash at low yields.

Coal from the Eagle field near Chicken gave a product containing 6.6 percent ash in washed coal at 38.4 percent yields. The sulfur content in the sample is 1.41 percent. Much of the sulfur was organic an no significant reduction in sulfur is possible by cleaning.

High volatile A bituminous coal from Nulato has high ash content and could be cleaned to give a product with 10.1 percent ash and F.S.I. of 9.6 and ranks as one of the best coking quality coals in Alaska. However, economically recoverable seams have not yet been identified.

The high volatile bituminous coal from Tramway Bar can yield significantly improved products containing 11.5 percent ash and 0.27 percent sulfur by washing.

The lower 30 feet of the Waterfall seam in the Capps basin of the Beluga coal field contained 10.2 percent ash. Washing, however, gave a product analyzing 7.2 percent ash and 0.20 percent sulfur.

The Capps bed and the top 6 feet of the Waterfall bed which is high in ash, can be washed to give a product containing less than 8.0 percent ash.

The Green bed from the Beluga field contained 8.2 percent ash and washing can further reduce the ash content to give a premium quality product containing 4.7 percent ash and 0.22 percent sulfur.

Subbituminous "C" coals from Johnson and Canyon Creeks in the Yentna field can be washed to give acceptable grade washed coal i.e. about 10.0 percent ash.

The 55 foot-thick seam at Locality 2 in the Yentna coal field had an ash content of 4.1 percent and washing will not significantly reduce ash.

Coal beds from Ninilchik, Happy Creek and Cabin bed in the Kenai field can be washed to give products containing less than 9.0 percent ash and 0.5 percent sulfur.

The two samples, a high volatile A and a high volatile B bituminous coal, collected from the Matanuska coal field were low in total sulfur and nearly free of pyritic sulfur; however, appropriate crushing and specific gravity separation would provide significant ash reductions.

Washability studies of the six beds of coal from the Evan Jones mine showed it is possible to obtain a premium quality product with approximately 8 percent ash and less than 0.4 percent sulfur, by washing at 1.40 specific gravity while producing a middling product containing approximately 20 percent ash and less than 0.4 percent sulfur by further washing at 1.60 specific gravity.

Coal from Coal Creek basin of the Broad Pass coal field can give a product containing 8.7 percent ash and 0.21 percent sulfur when crushed to 65 mesh top size.

Coal from the Dunkle Mine in the Broad Pass field can be washed to obtain an acceptable product containing 9.0 percent ash and 0.42 percent sulfur. Finer crushing to 65 mesh improved liberation of ash forming impurities to give a clean coal product containing 6.4 percent ash and 0.46 percent sulfur.

Sulfur in the Little Tonzona coal bed is high and very little of it is in pyritic form. Although washing will reduce ash, it will not reduce sulfur in the product.

The coal bed from the Chignik Bay coal mines can be washed to give a product with 9.3 percent ash and 1.36 percent sulfur when crushed to 65 mesh.

The coal bed from the Herendeen Bay field can be washed to give a product containing less than 10.0 percent ash.

Washing at 65 mesh gave further improvements of products in most cases. Centrifugal techniques, in general, appear to give good yield/ash relationships down to 65 mesh top size. Float-sink tests on samples crushed to 200 and 325 mesh either did not show any significant improvement over 65 mesh top size coal or gave anomalous results. Although bituminous coals appeared to disperse well at 325 mesh top size, subbituminous coals tended to flocculate resulting in inaccurate float-sink data. Further tests on 200 and 325 mesh top size coals were discontinued.

Proximate and ultimate analyses showed that Alaskan coals in general are low in sulfur with the exception of a few localities.

Hardgrove grindability data show that subbituminous "C" coals of Nenana and Beluga fields are quite difficult to grind with H.G.I. of as low as 23. Very few of Alaska's coals have good Free Swelling Indexes. These are coals from Nulato and Castle Mountain Mine coals in the Matanuska field. High volatile B bituminous coals from Matanuska field had a F.S.I. of 2.

An evaluation of the concentration of major elements in the ash of 1.60 specific gravity float-sink products showed that Ca, Mg, Na are more concentrated in the float fraction low rank coals since these elements are associated with coal as exchangeable cations. In high rank coals Ca, Mg and Fe are present as carbonates and are therefore concentrated in the sink fractions. SiO_2, Al_2O3, and K_2O are more concentrated in the sink fraction since these are contained in detrital minerals in coal.

Table 1
Proximate and Ultimate Analyses of Raw Coals

Coal Field and Seam	Apparent ASTM Rank	Thickness (feet)	Sample Numbers	Basis*	Moisture %	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Northern Alaska Coal Fields															
No. 7 Bed	hv Cb	17	(UA-139)	1	11.25	24.74	42.82	21.19	8,252	50.61	4.03	0.82	23.10	0.02	0.25
Cape Beaufort				2		27.88	48.24	23.88	9,298	57.03	3.12	0.93	14.76	0.02	0.28
				3		36.62	63.38		12,215	74.92	4.10	1.22	19.39	0.03	0.37
Kokolik	hv Ab	11.6	(UA-126)	1	15.58	26.43	52.57	5.42	10,904	63.44	5.63	1.03	24.24	0.04	0.24
River				2		31.31	62.27	6.42	12,916	75.15	4.61	1.22	12.32	0.05	0.28
				3		33.46	66.54		13,803	80.31	4.93	1.30	13.17	0.06	0.29
No. 3 Bed	hv Bb	11.5	(UA-125)	1	11.95	30.36	55.37	2.37	11,242	65.90	5.20	1.31	25.00	0.06	0.27
Elusive Creek				2		34.48	62.88	2.64	12,768	74.84	4.39	1.49	16.33	0.07	0.31
				3		35.42	64.58		13,114	76.87	4.51	1.53	16.77	0.07	0.32
Wainwright	Subbit. B	5	(UA-109)	1	20.28	30.20	44.75	4.77	9,292	54.79	5.71	1.13	33.32	0.08	0.28
				2		37.88	56.13	5.99	11,655	68.73	4.31	1.42	19.20	0.10	0.35
				3		40.29	59.71		12,398	73.10	4.58	1.51	20.43	0.10	0.35
Meade	Subbit. B	5	(UA-110)	1	17.88	30.30	48.22	3.60	10,425	60.04	5.87	1.35	28.71	0.06	0.43
River				2		36.90	58.72	4.38	12,695	73.12	4.72	1.64	15.61	0.07	0.53
				3		38.59	61.41		13,277	76.47	4.94	1.71	16.33	0.08	0.55
Sagwon	hv Cb	6.5	(UA-114)	1	14.71	15.74	15.65	53.90	3,591	20.98	3.37	0.53	21.16	0.04	0.06
Bluffs				2		18.45	18.36	63.19	4,210	24.60	2.02	0.62	9.50	0.05	0.07
				3		50.13	49.87		11,439	66.83	5.49	1.67	25.81	0.14	0.20
Northwest Alaska Coal Fields															
Chicago	Subbit. C	3	(UA-138)	1	30.70	29.62	29.22	10.46	6,643	39.98	6.28	0.83	41.85	0.04	0.60
Creek				2		42.73	42.18	15.09	9,586	57.69	4.11	1.20	21.07	0.06	0.84
Seward Peninsula				3		50.33	49.67		11,290	67.94	4.78	1.77	24.53	0.07	0.98

*1-EQUILIBRIUM MOISTURE
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Table I (Continued)
Proximate and Ultimate Analyses of Raw Coals

Coal Field and Seam	Apparent ASTM Rank	Thickness (feet)	Sample Numbers	Basis*	Moisture %	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Unalakleet Coal Creek	Subbit. C		(UA-151)	1	19.84	41.45	29.73	8.98	8,741	50.35	6.71	0.69	32.83	0.01	0.44
				2		51.71	37.09	11.20	10,905	62.81	5.60	0.87	18.98	0.01	0.54
				3		58.23	41.77		12,281	70.73	6.31	0.97	21.38	0.01	0.61
Interior Alaska Coal Fields															
Nenana No. 2 Seam	Subbit. C	27.8	(UA-105)	1	26.76	33.12	32.25	7.87	7,966	46.41	6.42	0.63	38.50	0.02	0.17
				2		45.23	44.03	10.74	10,876	63.38	4.68	0.86	20.11	0.02	0.23
				3		50.67	49.33		12,185	71.01	5.24	0.96	22.54	0.03	0.25
Lignite Creek	Lignite	7	(UA-141)	1	28.46	32.75	29.40	9.39	6,757	41.96	6.64	0.56	41.21	0.01	0.24
				2		45.78	41.45	12.77	9,445	58.66	4.83	0.79	22.62	0.01	0.33
				3		52.49	47.51		10,829	67.24	5.54	0.91	25.93	0.01	0.38
Moose Seam	Subbit. C	21.6	(UA-103)	1	21.42	36.02	34.88	7.68	8,953	51.69	6.34	0.81	33.33	0.01	0.15
				2		45.85	44.38	9.77	11,393	65.78	5.02	1.03	18.25	0.01	0.15
				3		50.81	49.19		12,627	72.90	5.56	1.15	20.18	0.01	0.21
Caribou Seam	Subbit. C	16.6	(UA-104)	1	21.93	35.88	32.85	9.34	8,567	49.44	6.10	0.69	34.30	0.02	0.13
				2		45.96	42.08	11.96	10,973	63.33	4.67	0.88	18.99	0.02	0.17
				3		52.20	47.80		12,464	71.93	5.30	1.00	21.57	0.03	0.20
Basal Bed (Bed A) Arctic Mine	Subbit. C	60	(UA-140)	1	24.32	33.75	27.15	14.78	7,360	42.73	6.15	0.55	35.50	0.02	0.29
				2		44.59	35.88	19.53	9,725	56.46	4.53	0.72	18.38	0.02	0.38
				3		55.42	44.58		12,086	70.16	5.63	0.89	22.84	0.03	0.48
No. 1 Bed Usibelli Mine	Subbit. C	18	(UA-129)	1	24.33	35.09	27.52	13.06	7,464	44.58	5.91	0.52	35.77	0.01	0.16
				2		46.37	36.37	17.26	9,864	58.92	4.21	0.69	18.71	0.01	0.21
				3		56.04	43.96		11,922	71.21	5.09	0.83	22.62	0.02	0.25
No. 3 Bed Usibelli Mine	Subbit. C	17	(UA-130)	1	24.54	36.42	29.59	9.44	8,047	46.53	6.05	0.52	37.30	0.01	0.16
				2		48.27	39.22	12.51	10,663	61.66	4.38	0.69	20.54	0.01	0.22
				3		55.17	44.83		12,188	70.47	5.01	0.79	23.48	0.02	0.25

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Table I (Continued)
Proximate and Ultimate Analyses of Raw Coals

Coal Field and Seam	Apparent ASTM Rank	Thickness (feet)	Sample Numbers	Basis*	Moisture %	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb	C,%	H,%	N,%	0,%	Sulfur Pyritic	Sulfur Total
Poker Flat Pit No. 4 Seam	Subbit. C	24	(UA-119)	1	25.29	32.51	32.55	9.85	7,779	45.28	6.30	1.13	37.11	0.02	0.33
				2		43.52	43.30	13.18	10,412	60.61	4.64	1.51	19.62	0.02	0.44
				3		50.13	49.87		11,993	69.81	5.34	1.74	22.60	0.03	0.51
No. 6 Seam Top	Subbit. C	3.2	(UA-100)	1	23.61	32.80	26.54	17.05	7,022	40.59	5.93	0.56	35.70	0.01	0.17
				2		42.94	34.74	22.32	9,193	53.14	4.30	0.73	19.29	0.01	0.22
				3		55.28	44.72		11,834	68.40	5.54	0.94	24.84	0.01	0.28
No. 6 Seam Middle	Subbit. C	18.3	(UA-101)	1	25.23	35.71	31.40	7.66	8,136	46.08	6.30	0.60	39.24	0.01	0.12
				2		47.76	41.99	10.25	10,882	61.64	4.65	0.80	22.50	0.01	0.16
				3		53.22	46.78		12,124	68.68	5.18	0.89	25.07	0.01	0.18
No. 6 Seam Lower	Subbit. C	3.3	(UA-102)	1	25.68	34.12	29.83	10.37	7,516	43.87	6.05	0.59	38.99	0.01	0.13
				2		45.91	40.14	13.95	10,113	59.03	4.28	0.80	21.77	0.01	0.17
				3		53.36	46.64		11,752	58.60	4.97	0.93	25.30	0.01	0.20
Marguerite Creek	Subbit. C	30.5	(UA-120)	1	29.05	32.03	30.44	8.48	7,445	44.24	6.23	0.50	40.44	0.00	0.11
				2		45.14	42.91	11.95	10,493	62.36	4.20	0.71	20.63	0.00	0.15
				3		51.27	48.73		11,917	70.82	4.77	0.81	23.43	0.00	0.17
Yanert Mine	hv Bb	5	(UA-132)	1	5.51	17.67	25.22	51.60	5,412	31.73	3.34	0.63	12.52	0.07	0.18
				2		18.70	26.69	54.61	5,728	33.58	2.88	0.66	8.08	0.07	0.19
				3		41.20	58.80		12,650	73.98	6.35	1.46	17.80	0.16	0.41
Jarvis Creek No. 1 Seam	Subbit. C	10	(UA-106)	1	20.58	36.20	34.16	9.06	8,746	49.83	5.84	0.80	33.42	0.31	1.05
				2		45.58	43.01	11.41	11,012	62.75	4.45	1.00	19.07	0.39	1.32
				3		51.45	48.55		12,430	70.83	5.02	1.13	21.53	0.44	1.49
Eagle Coal Creek	Subbit. B	30	(UA-121)	1	24.94	32.44	25.33	17.29	5,717	38.54	4.92	0.77	38.02	0.02	0.46
				2		43.22	33.75	23.03	7,616	51.35	2.84	1.02	21.15	0.02	0.61
				3		56.15	43.85		9,894	66.71	3.69	1.32	27.49	0.03	0.79

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Table I (Continued)
Proximate and Ultimate Analyses of Raw Coals

Coal Field and Seam	Apparent ASTM Rank	Thickness (feet)	Sample Numbers	Basis*	Moisture %	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Eagle	Subbit. C	5.5	(UA-124)	1	23.59	31.77	23.65	20.99	5,474	35.01	5.01	0.58	37.33	0.07	1.08
Chicken				2		41.58	30.95	27.47	7,164	45.82	3.10	0.76	21.44	0.09	1.41
				3		57.33	42.67		9,878	63.17	4.27	1.05	29.57	0.12	1.94
Nulato	hv Ab	1	(UA-128)	1	3.11	11.21	22.35	63.33	4,762	26.29	2.31	0.49	7.22	0.16	0.36
				2		11.57	23.06	65.37	4,915	27.13	2.02	0.51	4.59	0.16	0.38
				3		33.41	66.59		14,190	78.33	5.83	1.46	0.47	1.08	
Nulato	hv Ab		(UA-128)	1	3.60	29.06	58.14	9.20	11,438	74.99	5.24	0.49	9.04	0.08	1.04
1.60 Specific				2		30.15	60.31	9.55	11,866	77.79	5.02	0.51	6.06	0.08	1.07
Gravity Float				3		33.33	66.67		13,118	86.00	5.55	0.56	0.09	1.19	
Tramway	hv Bb	13	(UA-117)	1	6.38	24.29	33.54	35.79	7,263	42.72	3.62	0.55	17.18	0.04	0.14
Bar				2		25.94	35.83	38.23	7,758	45.64	3.10	0.59	12.29	0.04	0.15
				3		41.99	58.01		12,559	73.88	5.02	0.95	0.07	0.25	
South Central Alaska Coal Fields															
Beluga	Subbit. C	30	(UA-113)	1	23.65	35.20	33.34	7.81	8,327	47.98	6.25	0.54	37.28	0.01	0.14
Waterfall				2		46.10	43.67	10.23	10,907	62.84	4.71	0.71	21.33	0.01	0.18
Seam				3		51.35	48.65		12,151	70.01	5.25	0.79	0.01	0.21	
Beluga	Subbit. C	6	(UA-148)	1	22.17	27.60	20.29	29.94	5,960	37.00	5.28	0.44	27.14	0.02	0.20
Waterfall Bed				2		35.46	26.07	38.47	7,658	47.54	3.60	0.56	9.57	0.26	
Top 6'				3		57.63	42.37		12,446	77.27	4.76	3.21	14.40	0.36	
Capps Bed	Subbit. C	15	(UA-127)	1	20.87	39.90	27.56	11.67	7,242	47.34	5.77	0.50	34.55	0.08	0.17
				2		50.42	34.93	14.75	9,910	59.83	4.34	0.63	20.23	0.22	
				3		59.15	40.85		11,625	70.08	5.09	0.73	23.74	0.26	
Green Bed	Subbit. C	25	(UA-152)	1	27.59	34.87	31.57	5.97	8,051	46.67	6.92	0.75	39.57	0.01	0.12
Lone Ridge				2		48.16	43.59	8.25	11,119	44.46	5.29	1.03	20.81	0.01	0.16
Mine				3		52.49	47.51		12,119	70.25	5.76	1.12	0.01	0.18	

*1-EQUILIBRIUM MOISTURE
2-MOISTURE FREE
3-MOISTURE AND ASH FREE

Table I (Continued)
Proximate and Ultimate Analyses of Raw Coals

Coal Field and Seam	Apparent ASTM Rank	Thickness (feet)	Sample Numbers	Basis*	Moisture %	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Yentna	Subbit. C	24	(UA-149)	1	25.34	33.74	30.71	10.21	7,743	44.99	6.42	0.64	37.56	0.01	0.18
Johnson Creek				2		45.19	41.14	13.67	10,371	60.26	4.80	0.86	20.17	0.01	0.24
				3		52.35	47.65		12,013	69.80	5.56	0.99	0.02	0.28	
Yentna	Subbit. C	34	(UA-150)	1	20.80	35.78	28.54	14.88	7,857	45.22	6.20	0.66	32.90	0.01	0.14
Canyon Creek				2		45.18	36.03	18.79	9,921	57.09	4.89	0.83	18.23	0.01	0.17
				3		55.64	44.36		12,216	50.30	6.03	1.02	22.44	0.02	0.21
Yentna	Lignite	10	(UA-115)	1	29.80	38.26	28.61	3.33	7,943	45.20	6.76	0.53	44.07	0.01	0.11
Locality 2				2		54.50	40.76	4.74	11,315	64.39	4.87	0.75	25.10	0.01	0.15
Lower				3		57.21	42.79		11,879	67.59	5.11	0.79	26.35	0.01	0.16
Yentna	Lignite	10	(UA-116)	1	29.86	39.29	28.43	2.42	8,017	45.28	6.89	0.49	44.67	0.01	0.05
Locality 2				2		56.02	40.54	3.44	11,429	64.84	5.06	0.70	25.89	0.01	0.07
Upper				3		58.02	41.98		11,837	67.16	5.24	0.73	26.35	0.01	0.08
Kenai	Subbit. C	6	(UA-118)	1	23.01	35.63	32.71	8.65	8,028	47.23	6.07	0.62	37.20	0.01	0.23
Cabin				2		46.28	42.49	11.23	10,428	61.35	4.54	0.81	21.77	0.01	0.30
Bed				3		52.13	47.87		11,747	69.11	5.11	0.91	24.53	0.01	0.34
Kenai	Subbit. C	6	(UA-122)	1	23.72	36.01	27.02	13.25	7,437	42.58	6.23	0.66	37.03	0.04	0.25
Ninilchik				2		47.21	35.42	17.37	9,750	55.82	4.69	0.87	20.92	0.05	0.33
				3		57.13	42.87		11,800	67.55	5.68	1.05	25.33	0.06	0.39
Kenai	Subbit. C	6	(UA-131)	1	23.25	35.32	31.74	9.69	8,292	47.86	5.99	0.84	35.33	0.03	0.29
Happy Creek				2		46.01	41.35	12.63	10,803	62.36	4.42	1.09	19.12	0.04	0.38
				3		52.67	47.33		12,365	71.38	5.06	1.25	21.88	0.04	0.43
Matanuska	hv Bb		(UA-108)	1	5.87	35.73	43.96	14.44	11,101	63.63	5.11	1.14	15.33	0.04	0.35
Big Seam				2		37.96	46.70	15.34	11,794	67.60	4.73	1.21	10.75	0.04	0.37
				3		44.84	55.16		13,864	79.85	5.59	1.43	12.70	0.05	0.43

*1-EQUILIBRIUM MOISTURE
2-MOISTURE FREE
3-MOISTURE AND ASH FREE

Table I (Continued)
Proximate and Ultimate Analyses of Raw Coals

Coal Field and Seam	Apparent ASTM Rank	Thickness (feet)	Sample Numbers	Basis*	Moisture %	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
No. 7A Bed	hv Bb	10	(UA-142)	1	4.84	34.63	42.30	18.23	10,730	60.31	5.31	1.30	14.45	0.02	0.40
Evan Jones				2		36.39	44.45	19.16	11,276	63.38	5.01	1.36	10.67	0.02	0.42
Mine				3		45.02	54.98		13,948	78.40	6.20	1.68	13.20	0.02	0.52
No. 7 Lower	hv Bb	2.4	(UA-143)	1	4.64	37.95	40.50	16.91	10,908	61.20	5.29	1.31	14.86	0.04	0.43
Bed - Evan Jones				2		39.80	42.47	17.73	11,439	64.18	5.00	1.38	11.26	0.04	0.45
Mine				3		48.38	51.62		13,904	78.01	6.08	1.67	13.69	0.05	0.55
No. 7 Upper	hv Bb	2.6	(UA-144)	1	4.87	37.70	41.56	15.87	11,116	62.06	5.48	1.39	14.77	0.01	0.43
Bed - Evan Jones				2		39.62	43.70	16.68	11,685	65.24	5.19	1.46	10.98	0.01	0.45
Mine				3		47.56	52.44		14,024	78.30	6.23	1.76	13.17	0.01	0.54
No. 6 Lower	hv Bb	3.7	(UA-145)	1	5.10	33.86	42.04	19.00	10,531	59.19	5.29	1.30	14.87	0.02	0.35
Bed - Evan Jones				2		35.68	44.30	20.02	11,097	62.37	4.98	1.37	10.89	0.02	0.37
Mine				3		44.61	55.39		13,874	77.98	6.22	1.71	13.62	0.02	0.47
No. 6 Upper	hv Bb	3.8	(UA-146)	1	4.71	33.68	31.84	29.77	8,979	50.92	4.65	1.13	13.18	0.02	0.35
Bed - Evan Jones				2		35.34	33.42	31.24	9,423	53.44	4.32	1.19	9.44	0.02	0.37
Mine				3		51.40	48.60		13,704	77.71	6.29	1.73	13.73	0.03	0.54
No. 5 Bed	hv Bb	15	(UA-147)	1	4.82	30.52	30.45	34.21	8,266	46.44	4.49	1.11	13.51	0.05	0.24
Evan Jones				2		32.06	32.00	35.94	8,684	48.79	4.15	1.16	9.70	0.05	0.26
Mine				3		50.06	49.94		13,557	76.17	6.48	1.82	15.13	0.08	0.40
Matanuska	hv Ab	7	(UA-107)	1	1.78	28.23	52.20	17.78	12,258	69.33	4.66	1.64	6.13	0.09	0.46
Lower Seam				2		28.75	53.15	18.10	12,480	70.59	4.54	1.68	4.62	0.09	0.47
				3		35.10	64.90		15,238	86.19	5.54	2.05	5.65	0.11	0.57
Broad Pass	Lignite	8	(UA-111)	1	28.32	33.53	24.08	14.07	6,395	38.14	6.06	0.54	41.04	0.03	0.15
Coal Creek				2		46.77	33.60	19.63	8,921	53.21	4.04	0.75	22.16	0.04	0.21
Seam				3		58.20	41.80		11,100	66.20	5.03	0.93	27.58	0.05	0.26

*1-EQUILIBRIUM MOISTURE
2-MOISTURE FREE
3-MOISTURE AND ASH FREE

Table I (Continued)
Proximate and Ultimate Analyses of Raw Coals

Coal Field and Seam	Apparent ASTM Rank	Thickness (feet)	Sample Numbers	Basis*	Moisture %	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Broad Pass	Subbit. B	5.3	(UA-123)	1	33.07	27.63	28.88	10.42	7,305	41.37	6.79	0.56	40.57	0.11	0.29
Dunkle Bed				2		41.28	43.15	15.57	10,915	61.81	4.61	0.83	16.74	0.16	0.44
				3		48.89	51.11		12,928	73.21	5.46	0.99	19.82	0.19	0.52
Southwest Alaska Coal Fields															
Little	Subbit. C	127	(UA-112)	1	21.21	37.59	30.36	10.84	7,663	45.02	5.80	0.64	36.59	0.06	1.11
Tonzona				2		47.72	38.53	13.75	9,725	57.14	4.34	0.81	22.56	0.08	1.40
Coal Bed				3		55.33	44.67		11,277	66.25	5.03	0.94	26.15	0.09	1.63
Chignik	hv Cb	9	(UA-136)	1	6.66	30.29	29.28	33.77	8,106	45.70	4.48	0.52	13.89	1.05	1.64
Chignik Bay				2		32.45	31.37	36.18	8,685	48.96	4.00	0.55	8.55	1.12	1.76
Mine				3		50.85	49.15		13,609	76.71	6.19	2.88	11.46	1.76	2.76
Herendeen	hv Bb	1	(UA-137)	1	5.46	25.50	27.83	41.21	6,897	40.17	3.81	1.04	11.96	0.87	1.81
Bay				2		26.97	29.44	43.59	7,295	42.49	3.39	1.10	7.52	0.89	1.91
Coal Point				3		47.81	52.19		12,933	75.32	6.01	1.94	13.34	1.58	3.39

*1-EQUILIBRIUM MOISTURE
2-MOISTURE FREE
3-MOISTURE AND ASH FREE

Table II

Hardgrove Grindability and Free Swelling Indexes of Raw Coal

Coal Field and Seam	Sample Number	Air Dried Samples HGI	FSI
Northern Alaska Coal Fields			
No. 7 Bed Cape Beaufort	UA-139	58	0
Kokolik River	UA-126	56	0
No. 3 Bed Elusive Creek	UA-125	74	0
Wainwright	UA-109	54	0
Meade River	UA-110	58	0
Sagwon Bluffs	UA-114		
Northwest Alaska Coal Fields			
Chicago Creek	UA-138	42	0
Unalakleet Coal Creek	UA-151	22	0
Interior Alaska Coal Fields			
Nenana No. 2 Seam	UA-105	28	0
Lignite Creek	UA-141	24	0
Moose Seam	UA-103	28	0
Caribou Seam	UA-104	31	0
Basal Bed Arctic Mine	UA-140	26	0
No. 1 Bed Usibelli Mine	UA-129	38	0
No. 3 Bed Usibelli Mine	UA-130	32	0

Table II (Continued)

Hardgrove Grindability and Free Swelling Indexes of Raw Coal

Coal Field and Seam	Sample Number	Air Dried Samples HGI	FSI
Poker Flat Pit No. 4 Seam	UA-119	27	0
No. 6 Seam Top	UA-100	32	0
No. 6 Seam Middle	UA-101	31	0
No. 6 Seam Lower	UA-102	32	0
Marguerite Creek	UA-120	38	0
Yanert Mine	UA-132	48	0
Jarvis Creek No. 1 Seam	UA-106	28	0
Eagle Coal Creek	UA-121	70	0
Eagle Chicken	UA-124	62	0
Nulato	UA-128	56	0
Nulato	UA-128(1.6 Float)	–	9.6
Tramway Bar	UA-117	45	0
South Central Alaska Coal Fields			
Beluga Waterfall Seam	UA-113	23	0
Beluga Waterfall Top 6'	UA-148	32	0
Capps Bed	UA-127	42	0
Green Bed Lone Ridge Mine	UA-152	28	0

Table II (Continued)

Hardgrove Grindability and Free Swelling Indexes of Raw Coal

Coal Field and Seam	Sample Number	Air Dried Samples HGI	FSI
Yentna Johnson Creek	UA-149	24	0
Yentna Canyon Creek	UA-150	28	0
Yentna Locality 2 Lower	UA-115	35	0
Yentna Locality 2 Upper	UA-116	32	0
Kenai Cabin Bed	UA-118	23	0
Kenai Ninilchik	UA-122	25	0
Kenai Happy Creek	UA-131	32	0
Matanuska Big Seam	UA-108	37	3
No. 7A Bed Evan Jones	UA-142	41	2
No. 7 Lower Bed Evan Jones	UA-143	40	2
No. 7 Upper Bed Evan Jones	UA-144	46	2
No. 6 Lower Bed Evan Jones	UA-145	44	2
No. 6 Upper Bed Evan Jones	UA-146	44	2

Table II (Continued)

Hardgrove Grindability and Free Swelling Indexes of Raw Coal

Coal Field and Seam	Sample Number	Air Dried Samples HGI	FSI
No. 5 Bed Evan Jones	UA-147	50	2
Matanuska Lower Seam	UA-107	65	8
Broad Pass Coal Creek Seam	UA-111	49	0
Broad Pass Dunkle Bed	UA-123	38	0
Southwest Alaska Coal Fields			
Little Tonzona Coal Bed	UA-112	28	0
Chignik Chignik Bay Mine	UA-136	46	1
Herendeen Bay Coal Point	UA-137	52	0

Table III
Concentration of Major Elements in the Raw Coal Ash (750°C), percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	SO_3	MnO
Northern Alaska Coal Fields											
No. 7 Bed Cape Beaufort	UA 139	59.0	21.8	2.4	2.2	4.9	3.05	1.1	0.8	1.4	0.03
Kokolik River	UA 126	42.4	27.1	5.5	3.0	6.1	1.63	1.9	2.2	4.6	0.03
No. 3 Bed Elusive Creek	UA 125	22.3	26.5	12.3	6.6	15.0	2.14	0.7	0.8	3.0	0.03
Wainwright	UA 109	41.7	5.9	18.8	13.0	13.2	2.16	1.0	0.1	13.1	0.29
Meade River	UA 110	43.8	23.3	6.1	3.3	4.4	.97	1.8	1.3	2.1	0.06
Sagwon Bluffs	UA 114	66.5	20.1	3.9	2.2	1.8	.16	3.5	1.3	.7	0.04
Northwest Alaska Coal Fields											
Chicago Creek Seward Peninsula	UA 138	22.0	13.6	30.2	2.9	13.7	0.46	0.5	0.6	11.7	0.72
Unalakleet Coal Creek	UA 151	40.8	20.5	5.4	5.9	11.2	2.21	1.6	1.0	6.4	0.02
Interior Alaska Coal Fields											
No. 2 Seam	UA 105	47.3	20.7	8.9	2.8	12.9	0.15	1.2	0.9	6.3	0.44
Lignite Creek	UA 141	43.0	20.2	7.4	4.2	15.2	0.19	1.4	0.8	4.8	0.32
Moose Seam	UA 103	34.7	25.0	5.2	7.7	16.7	0.38	1.6	1.2	7.2	0.06
Caribou Seam	UA 104	43.1	21.4	9.0	5.2	14.7	0.97	1.8	1.1	5.6	0.07

Table III (Continued)
Concentration of Major Elements in the Raw Coal Ash (750°C), percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	SO_3	MnO
Basal Bed (A) Arctic Mine	UA 140	56.3	24.6	3.2	2.7	6.3	0.95	2.4	1.4	1.7	0.04
No. 1 Bed Usibelli Mine	UA 129	47.1	20.8	4.1	2.6	16.4	0.40	1.2	1.1	2.5	0.07
No. 3 Bed Usibelli Mine	UA 130	44.4	14.6	5.8	2.6	17.3	0.33	1.1	0.9	2.8	0.17
Poker Flat Pit No. 4 Seam	UA 119	43.4	22.7	6.7	2.7	16.6	1.08	2.2	1.1	6.5	0.21
No. 6 Seam Top	UA 100	55.3	19.3	7.1	2.2	9.4	0.28	1.8	1.0	3.1	0.44
No. 6 Seam Middle	UA 101	37.7	22.6	9.4	3.8	22.8	0.48	1.1	0.9	5.0	0.37
No. 6 Seam Lower	UA 102	39.5	21.4	6.6	2.5	24.1	0.05	1.1	1.0	3.5	0.19
Marguerite Creek	UA 120	44.8	15.8	3.5	4.1	21.3	0.29	1.0	0.8	3.3	0.10
Yanert Mine	UA 132	64.0	22.7	4.0	1.2	1.1	0.49	2.8	1.0	0.6	0.02
Jarvis Creek No. 1 Seam	UA 106	42.7	16.6	11.2	2.2	20.8	0.45	0.7	1.1	21.7	0.12
Eagle Coal Creek	UA 121	47.5	20.3	5.5	2.9	11.7	0.62	0.7	1.2	5.3	0.12
Eagle Chicken	UA 124	51.0	22.4	6.5	1.5	6.0	0.77	1.4	0.7	8.5	0.08
Nulato	UA 128	62.7	21.8	3.8	1.5	0.3	1.88	4.4	1.1	0.8	0.01
Tramway Bar	UA 117	52.8	30.8	5.1	1.4	2.3	0.51	4.0	1.7	.9	0.05

Table III (Continued)
Concentration of Major Elements in the Raw Coal Ash (750°C), percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	SO_3	MnO
South Central Alaska Coal Fields											
Waterfall Seam	UA 113	41.0	28.9	6.7	1.9	16.6	0.69	2.1	0.8	7.9	0.10
Waterfall Bed Top 6'	UA 148	57.3	29.1	4.2	1.2	2.5	0.27	2.6	0.9	1.2	0.06
Capps Bed	UA 127	53.8	25.9	2.4	1.4	9.5	0.34	1.7	1.1	2.3	0.04
Green Bed Lone Ridge Mine	UA 152	34.5	22.6	7.7	4.1	21.5	0.30	0.8	0.7	4.6	0.08
Yentna Johnson Creek	UA 149	51.8	20.2	7.4	2.7	14.4	0.40	2.2	1.1	2.0	0.12
Yentna Canyon Creek	UA 150	55.8	26.6	2.6	1.6	5.3	0.27	2.0	1.1	0.9	0.02
Yentna Locality 2 Lower	UA 115	16.8	33.3	9.5	6.3	28.0	.17	1.0	1.1	9.1	0.12
Yentna Locality 2 Upper	UA 116	11.6	27.9	10.6	7.4	37.2	.18	0.6	0.8	10.5	0.13
Kenai Cabin Bed	UA 118	37.4	21.0	5.7	3.6	25.3	1.28	1.3	0.9	6.2	0.11
Kenai Ninilchik	UA 122	48.4	19.6	7.7	5.2	7.9	3.06	2.0	0.9	2.6	0.15
Kenai Happy Creek	UA 131	40.7	15.7	9.2	4.4	18.5	0.93	1.4	0.7	4.7	0.48
Big Seam	UA 108	53.5	28.8	6.5	2.3	4.4	0.16	1.9	1.6	2.4	0.10
No. 7A Bed Evan Jones Mine	UA 142	51.9	27.4	7.6	1.8	2.5	0.59	1.6	1.6	0.8	0.09

Table III (Continued)
Concentration of Major Elements in the Raw Coal Ash (750°C), percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	SO_3	MnO
No. 7 Lower Bed Evan Jones Mine	UA 143	40.1	27.7	17.2	2.3	3.7	0.63	1.0	1.7	1.3	0.28
No. 7 Upper Bed Evan Jones Mine	UA 144	47.6	26.6	11.9	2.0	2.6	0.72	1.4	1.9	1.0	0.15
No. 6 Lower Bed Evan Jones Mine	UA 145	50.7	29.2	5.0	1.6	2.7	0.21	2.0	1.5	0.4	0.05
No. 6 Upper Bed Evan Jones Mine	UA 146	53.9	30.0	4.2	1.2	2.5	0.27	2.6	0.9	1.2	0.06
No. 5 Bed Evan Jones Mine	UA 147	54.2	25.6	6.6	2.3	2.6	0.48	2.1	1.3	1.3	0.11
Matanuska Lower Seam	UA 107	53.3	25.7	4.4	1.9	3.6	0.43	2.1	1.3	1.7	0.12
Broad Pass Coal Creek Seam	UA 111	45.4	29.3	4.6	1.1	9.1	.16	2.1	1.2	3.2	0.17
Broad Pass Dunkle Bed	UA 123	44.0	23.4	16.4	1.8	7.2	0.36	0.7	1.1	4.0	0.19
Southwest Alaska Coal Fields											
Little Tonzona Coal Bed	UA 112	29.8	19.4	6.9	3.3	22.7	.27	1.2	0.9	17.2	0.05
Chignik Chignik Bay Mine	UA 136	54.2	28.3	4.9	1.2	4.1	0.33	1.1	1.2	3.3	0.04
Herendeen Bay Coal Point	UA 137	53.8	17.0	11.7	1.8	6.5	1.44	1.3	0.8	4.7	0.23

Table IV

Fusibility of Ash of the
Raw Coal Samples

COAL FIELD & SEAM	SAMPLE NUMBER	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
Northern Alaska Coal Fields				
No. 7 Bed Cape Beaufort	UA-139	2320	2410	2520
Kokolik River	UA-126	2347	2356	2561
No. 3 Bed Elusive Creek	UA-125	2454	2514	2572
Wainwright	UA-109	2540	2590	2630
Meade River	UA-110	2500	2540	2580
Sagwon Bluffs	UA-114	2670	2730	2840
Northwest Alaska Coal Fields				
Chicago Creek Seward Peninsula	UA-138	2333	2350	2564
Unalakleet Coal Creek	UA-151	2240	2258	2334
Interior Alaska Coal Fields				
No. 2 Seam	UA-105	2150	2180	2210
Lignite Creek	UA-141	2287	2303	2377
Moose Seam	UA-103	2200	2250	2300
Caribou Seam	UA-104	2150	2180	2210
Basal Bed (A) Arctic Mine	UA-140	2220	2536	2620

Table IV (Continued)

Fusibility of Ash of the
Raw Coal Samples

COAL FIELD & SEAM	SAMPLE NUMBER	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
No. 1 Bed Usibelli Mine	UA-129	2383	2420	2501
No. 3 Bed Usibelli Mine	UA-130	2217	2228	2324
Poker Flat Pit No. 4 Seam	UA-119	2130	2180	2380
No. 6 Seam Top	UA-100	2350	2400	2560
No. 6 Seam Middle	UA-101	2100	2130	2160
No. 6 Seam Lower	UA-102	2150	2180	2210
Marguerite Creek	UA-120	2250	2259	2277
Yanert Mine	UA-132	2742	2800+	2800+
Jarvis Creek No. 1 Seam	UA-106	1980	2030	2080
Eagle Coal Creek	UA-121	2371	2375	2430
Eagle Chicken	UA-124	2490	2503	2540
Nulato	UA-128	2468	2593	2723
Tramway Bar	UA-117	2680	2730	2840
South Central Alaska Coal Fields				
Waterfall Seam	UA-113	2400	2450	2500

Table IV (Continued)

Fusibility of Ash of the
Raw Coal Samples

COAL FIELD & SEAM	SAMPLE NUMBER	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
Waterfall Bed Top 6'	UA-148	2800+	2800+	2800+
Capps Bed	UA-127	2457	2464	2539
Green Bed Lone Ridge Mine	UA-152	2278	2295	2407
Yentna Johnson Creek	UA-149	2346	2370	2515
Yentna Canyon Creek	UA-150	2703	2790	2790+
Yentna Locality 2 Lower	UA-115	2520	2550	2580
Yentna Locality 2 Upper	UA-116	2140	2170	2200
Kenai Cabin Bed	UA-118	2090	2120	2150
Kenai Ninilchik	UA-122	2218	2246	2296
Kenai Happy Creek	UA-131	2240	2243	2272
Big Seam	UA-108	2520	2570	2670
No. 7A Bed Evan Jones Mine	UA 142	2200	2511	2590
No. 7 Lower Bed Evan Jones Mine	UA-143	2535	2593	2606
No. 7 Upper Bed Evan Jones Mine	UA-144	2590	2675	2697

Table IV (Continued)

Fusibility of Ash of the
Raw Coal Samples

COAL FIELD & SEAM	SAMPLE NUMBER	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
No. 6 Lower Bed Evan Jones Mine	UA-145	2707	2790	2790+
No. 6 Upper Bed Evan Jones Mine	UA-146	2794	2800+	2800+
No. 5 Bed Evan Jones Mine	UA-147	2723	2751	2793
Matanuska Lower Seam	UA-107	2670	2720	2830
Broad Pass Coal Creek Seam	UA-111	2300	2350	2440
Broad Pass Dunkle Bed	UA-123	2479	2505	2548
Southwest Alaska Coal Fields				
Little Tonzona Coal Bed	UA-112	2060	2090	2120
Chignik Chignik Bay Mine	UA-136	2794	2800+	2800+
Herendeen Bay Coal Point	UA-137	2701	2800+	2800+

TABLE V

Proximate and Ultimate Analysis of Float-Sink Products

Coal Field and Seam	Sample Numbers		Weight (%)	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb.	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Northern Alaska Coal Fields													
No. 7 Bed	UA-139	Float 1.60	67.07	34.71	57.81	7.48	11,492	70.18	3.59	1.13	17.37	0.01	0.24
Cape Beaufort	UA-139	Sink 1.60	32.93	17.74	18.32	63.94	4,095	24.34	1.80	0.39	9.37	0.01	0.16
Kokolik River	UA-126	Float 1.60	90.63	33.40	63.98	2.62	13,381	78.61	4.89	1.30	12.33	0.02	0.26
	UA-126	Sink 1.60	9.37	25.41	29.51	45.08	7,123	40.41	2.86	0.71	10.76	0.01	0.17
No. 3 Bed	UA-125	Float 1.60	93.31	36.36	62.22	1.42	12,685	74.28	4.60	1.75	17.71	0.01	0.24
Elusive Creek	UA-125	Sink 1.60	6.69	35.28	47.14	17.58	10,182	60.88	3.92	1.40	15.97	0.09	0.25
Wainwright	UA-109	Float 1.60	89.42	37.88	59.20	2.92	12,084	74.25	4.43	1.44	16.62	0.03	0.34
	UA-109	Sink 1.60	11.25	38.58	12.72	48.70	4,356	24.64	1.14	0.44	24.32	0.49	0.77
Meade River	UA-110	Float 1.60	95.61	38.13	59.49	2.38	13,282	76.76	3.15	1.70	15.32	0.02	0.69
	UA-110	Sink 1.60	4.39	31.68	42.74	25.58	7,263	53.93	3.49	1.30	14.61	1.20	1.42
Sagwon Bluffs	UA-114	Float 1.60	29.76	38.56	51.67	9.77	10,255	60.41	3.48	1.17	24.93	0.02	0.25
	UA-114	Sink 1.60	70.24	15.50	10.47	74.03	2,481	15.37	2.18	0.40	7.91	0.06	0.10
Northwest Alaska Coal Fields													
Chicago Creek	UA-138	Float 1.60	78.78	43.99	47.21	8.80	10,328	61.83	4.16	1.27	23.06	0.06	0.88
Seward Peninsula	UA138	Sink 1.60	21.22	39.52	23.99	36.49	6,632	40.36	2.96	0.87	18.67	0.25	0.65
Unalakleet	UA-151	Float 1.60	86.25	52.77	39.89	7.34	11,456	63.94	4.97	0.88	22.16	0.02	0.71
Coal Creek	UA-151	Sink 1.60	13.75	31.80	25.66	42.55	8,025	45.27	3.95	0.60	7.05	0.15	0.59
Interior Alaska Coal Fields													
No. 2 Seam	UA-105	Float 1.60	94.52	47.00	45.37	7.63	10,987	62.79	4.52	0.90	23.91	0.01	0.25
	UA-105	Sink 1.60	5.48	34.36	24.77	40.87	6,564	40.99	3.42	0.58	13.64	0.05	0.49
Lignite Creek	UA-141	Float 1.60	91.63	50.51	40.36	9.13	10,021	57.07	4.47	0.78	28.03	0.02	0.51
	UA-141	Sink 1.60	8.37	28.56	20.64	50.80	5,538	29.24	2.67	0.51	16.54	0.03	0.24

All results on a moisture free basis.

TABLE V (Continued)

Proximate and Ultimate Analysis of Float-Sink Products

Coal Field and Seam	Sample Numbers		Weight (%)	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb.	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Moose Seam	UA-103	Float 1.60	97.82	52.57	39.91	7.53	12,123	69.66	3.86	1.08	17.50	0.01	0.38
	UA-103	Sink 1.60	2.18	29.86	24.50	45.63	7,880	37.56	2.80	0.56	13.13	0.07	0.33
Caribou Seam	UA-104	Float 1.60	95.07	44.94	45.81	9.25	11,202	64.41	4.84	0.98	20.27	0.01	0.25
	UA-104	Sink 1.60	4.93	31.36	21.59	47.05	7,518	36.77	3.07	0.60	12.32	0.12	0.18
Basal Bed (A)	UA-140	Float 1.60	77.79	46.58	40.38	13.04	10,493	60.17	4.65	0.82	20.85	0.03	0.47
Arctic Mine	UA-140	Sink 1.60	22.21	34.71	24.26	41.03	6,144	39.73	3.51	0.41	14.91	0.05	0.41
No. 1 Bed	UA-129	Float 1.60	83.09	52.68	38.20	9.12	10,395	61.41	4.51	0.84	23.82	0.01	0.30
Usibelli Mine	UA-129	Sink 1.60	16.91	26.49	17.08	56.43	5,300	27.67	2.75	0.82	12.06	0.02	0.24
No. 3 Bed	UA-130	Float 1.60	92.63	50.25	43.98	5.77	10,910	64.16	4.79	0.81	24.33	0.04	0.14
Usibelli Mine	UA-130	Sink 1.60	7.37	34.89	26.70	38.41	7,180	42.02	3.39	0.58	15.45	0.02	0.15
Poker Flat Pit	UA-119	Float 1.60	87.22	50.06	42.72	7.22	10,879	60.81	4.87	0.82	26.05	0.02	0.22
No. 4 Seam	UA-119	Sink 1.60	12.78	44.50	35.54	19.96	9,287	55.47	4.45	0.79	19.10	0.02	0.22
No. 6 Seam	UA-100	Float 1.60	65.27	47.50	39.74	12.77	9,928	58.07	4.33	0.79	23.73	0.01	0.31
Top	UA-100	Sink 1.60	34.73	31.37	20.69	47.94	6,475	33.29	2.84	0.57	15.16	0.01	0.20
No. 6 Seam	UA-101	Float 1.60	95.74	49.06	43.28	7.66	10,758	63.43	4.68	0.84	23.19	0.01	0.20
Middle	UA-101	Sink 1.60	4.26	36.43	29.71	33.87	8,041	44.06	4.08	0.76	17.05	0.02	0.20
No. 6 Seam	UA-102	Float 1.60	91.43	45.46	42.63	11.91	9,923	65.99	4.85	0.85	16.18	0.01	0.22
Lower	UA-102	Sink 1.60	8.57	34.93	27.11	37.96	6,932	41.66	3.28	0.76	16.09	0.02	0.25
Marguerite	UA-120	Float 1.60	88.03	50.08	42.48	7.43	10,497	61.99	5.03	0.76	24.61	0.01	0.18
Creek	UA-120	Sink 1.60	11.97	39.85	33.66	26.48	8,742	48.69	4.06	0.64	19.95	0.02	0.17
Yanert Mine	UA-132	Float 1.60	30.43	32.37	55.34	12.28	11,957	66.43	4.31	1.50	15.05	0.05	0.42
	UA-132	Sink 1.60	69.57	14.33	13.52	72.15	3,187	17.49	1.81	0.45	7.96	0.07	0.14
Jarvis Creek	UA-106	Float 1.60	93.64	44.97	46.33	8.70	10,831	63.24	4.63	1.03	21.08	0.29	1.33
No. 1 Seam	UA-106	Sink 1.60	6.36	36.60	33.12	30.28	8,328	45.90	3.60	0.76	16.11	2.00	3.35

All results on a moisture free basis.

TABLE V (Continued)

Proximate and Ultimate Analysis of Float-Sink Products

Coal Field and Seam	Sample Numbers		Weight (%)	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb.	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Eagle	UA-121	Float 1.60	59.55	49.57	39.95	10.48	8,789	54.30	3.34	1.29	29.87	0.03	0.72
Coal Creek	UA-121	Sink 1.60	40.45	30.46	21.97	47.57	4,146	31.20	2.63	0.90	17.24	0.04	0.45
Eagle	UA-124	Float 1.60	58.46	48.80	42.03	9.17	9,563	58.79	4.04	0.95	25.74	0.04	1.31
Chicken	UA-124	Sink 1.60	41.54	29.79	14.13	56.08	4,315	26.19	2.42	0.65	12.75	0.08	1.91
Nulato	UA-128	Float 1.60	31.09	26.70	62.15	11.15	13,451	71.63	4.59	1.44	10.13	0.07	1.05
	UA-128	Sink 1.60	68.91	10.59	15.04	74.37	3,261	18.94	1.71	0.46	3.80	0.25	0.71
Tramway Bar	UA-117	Float 1.60	48.40	35.74	56.25	8.01	11,723	68.81	4.29	0.98	17.59	0.02	0.32
	UA-117	Sink 1.60	51.60	17.37	14.07	68.56	33,670	2.15	0.21	0.08	29.00	0.12	0.
Southcentral Alaska Coal Fields													
Waterfall	UA-113	Float 1.60	92.92	50.14	43.47	6.39	10,934	62.88	4.39	0.70	25.38	0.01	0.26
Seam	UA-113	Sink 1.60	7.08	34.11	22.76	43.13	6,558	36.81	3.24	0.53	15.94	0.03	0.35
Waterfall Bed	UA-148	Float 1.60	42.41	46.05	40.01	13.94	9,713	47.24	2.91	0.64	34.96	0.02	0.31
Top 6'	UA-148	Sink 1.60	57.59	28.14	20.47	51.39	4,872	26.53	2.58	0.47	18.83	0.05	0.21
Capps Bed	UA-127	Float 1.60	78.53	46.74	41.78	11.48	10,196	60.22	4.62	0.99	22.43	0.02	0.26
	UA-127	Sink 1.60	21.47	30.76	23.04	46.20	5,675	34.38	3.13	0.87	15.23	0.01	0.19
Green Bed	UA-152	Float 1.60	94.19	48.75	45.35	5.90	11,157	65.40	5.02	1.07	22.39	0.02	0.22
Lone Ridge Mine	UA-152	Sink 1.60	5.81	35.38	26.07	38.55	5,919	40.25	3.50	0.73	16.80	0.03	0.17
Yentna	UA-149	Float 1.60	82.44	47.97	24.09	9.95	10,544	61.64	4.36	0.90	23.00	0.01	0.15
Johnson Creek	UA-149	Sink 1.60	17.56	27.67	17.51	54.82	5,073	29.49	2.61	0.56	12.26	0.02	0.26
Yentna	UA-150	Float 1.60	70.72	48.05	42.06	9.89	10,888	63.17	4.91	0.97	20.82	0.01	0.24
Canyon Creek	UA-150	Sink 1.60	29.28	29.32	20.15	50.53	5,414	32.30	3.12	0.61	13.29	0.01	0.15
Yentna	UA-115	Float 1.60	89.61	54.51	41.60	3.89	11,301	62.38	4.88	0.78	27.89	0.01	0.18
Locality 2 Lower	UA-115	Sink 1.60	10.39	54.04	40.21	5.75	11,005	58.55	5.18	0.78	29.55	0.02	0.18

All results on a moisture free basis.

TABLE V (Continued)

Proximate and Ultimate Analysis of Float-Sink Products

Coal Field and Seam	Sample Numbers		Weight (%)	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb.	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Yentna	UA-116	Float 1.60	78.28	56.04	40.90	3.06	11,328	64.42	6.16	0.76	25.43	0.01	0.16
Locality 2 Upper	UA-116	Sink 1.60	21.72	55.92	39.97	4.11	11,104	62.15	4.98	0.80	27.80	0.01	0.17
Kenai	UA-118	Float 1.60	83.80	47.13	43.17	9.71	10,929	56.67	4.56	1.50	27.12	0.02	0.45
Cabin Bed	UA-118	Sink 1.60	16.20	35.02	28.18	36.80	7,372	46.58	4.42	0.66	11.15	0.02	0.39
Kenai	UA-122	Float 1.60	74.99	40.89	50.11	9.00	10,328	58.36	4.69	1.11	26.49	0.03	0.35
Ninilchik	UA-122	Sink 1.60	25.01	28.43	16.47	55.09	4,570	24.48	2.62	0.63	16.91	0.06	0.27
Kenai	UA-131	Float 1.60	81.92	50.19	40.44	9.37	10,100	55.76	4.36	1.09	28.99	0.	0.42
Happy Creek	UA-131	Sink 1.60	18.08	24.85	10.79	64.36	3,528	21.19	2.46	0.64	11.12	0.	0.23
Big Seam	UA-108	Float 1.60	82.12	38.32	55.61	6.08	13,268	74.56	3.64	1.44	13.86	0.01	0.42
	UA-108	Sink 1.60	17.88	26.89	15.61	57.50	4,846	27.64	2.33	0.52	11.84	0.14	0.16
No. 7A Bed	UA-142	Float 1.60	74.03	39.98	54.93	5.10	13,534	76.08	5.16	1.55	11.77	0.01	0.34
Evan Jones Mine	UA-142	Sink 1.60	25.97	23.16	13.61	63.23	4,141	24.22	2.37	0.53	9.14	0.01	0.51
No. 7 Lower Bed	UA-143	Float 1.60	75.72	41.92	51.83	6.25	13,390	73.69	5.67	1.24	12.74	0.03	0.41
Evan Jones Mine	UA-143	Sink 1.60	24.28	29.12	15.69	55.19	4,366	26.05	2.62	1.04	14.90	0.18	0.20
No. 7 Upper Bed	UA-144	Float 1.60	71.52	41.35	51.18	7.47	13,095	72.41	2.41	1.60	15.75	0.02	0.36
Evan Jones Mine	UA-144	Sink 1.60	28.48	33.91	25.56	40.53	7,782	44.24	3.60	0.99	10.40	0.11	0.24
No. 6 Lower Bed	UA-145	Float 1.60	80.31	38.04	52.46	9.50	12,704	71.64	5.16	1.03	12.33	0.02	0.34
Evan Jones Mine	UA-145	Sink 1.60	19.69	21.65	14.33	64.02	4,512	24.08	5.22	0.84	5.66	0.09	0.18
No. 6 Upper Bed	UA-146	Float 1.60	57.77	38.01	48.90	13.09	12,173	68.43	5.05	1.51	11.55	0.02	0.37
Evan Jones Mine	UA-146	Sink 1.60	42.23	25.59	19.92	54.49	5,648	31.82	2.92	0.80	9.78	0.09	0.19
No. 5 Bed	UA-147	Float 1.60	58.15	39.10	52.84	8.06	13,017	73.20	5.16	1.62	11.56	0.01	0.40
Evan Jones Mine	UA-147	Sink 1.60	41.85	22.40	12.31	65.29	3,934	22.76	2.25	0.54	8.88	0.01	0.28
Matanuska	UA-107	Float 1.60	83.14	28.69	64.11	7.20	14,337	79.31	5.15	1.80	6.09	0.03	0.45
Lower Seam	UA-107	Sink 1.60	16.86	17.10	22.38	60.52	5,065	28.91	2.36	0.74	7.18	0.21	0.28

All results on a moisture free basis.

TABLE V (Continued)

Proximate and Ultimate Analysis of Float-Sink Products

Coal Field and Seam	Sample Numbers		Weight (%)	Volatile Matter,%	Fixed Carbon,%	Ash %	Heating Value BTU/lb.	C,%	H,%	N,%	O,%	Sulfur Pyritic	Sulfur Total
Broad Pass	UA-111	Float 1.60	76.31	49.22	42.55	8.23	10,232	59.95	4.80	0.76	26.02	0.02	0.24
Coal Creek Seam	UA111	Sink 1.60	23.69	35.64	19.52	44.84	6,153	35.84	3.26	0.66	15.24	0.03	0.16
Broad Pass	UA-123	Float 1.60	85.02	43.67	50.33	6.00	11,828	68.29	4.93	1.02	19.28	0.04	0.48
Dunkle Bed	UA-123	Sink 1.60	14.98	31.79	10.40	57.81	4,348	26.63	2.48	0.20	12.65	0.14	0.23
Southwest Alaska Coal Fields													
Little Tonzona	UA-112	Float 1.60	88.91	50.93	39.44	9.63	10,128	59.66	5.03	0.84	23.43	0.04	1.41
Coal Bed	UA-112	Sink 1.60	11.09	35.25	16.67	48.09	5,445	33.68	4.24	0.59	11.99	0.23	1.41
Chignik	UA-136	Float 1.60	52.59	37.44	53.49	9.07	12,712	70.99	4.87	0.75	13.06	0.21	1.26
Chignik Bay Mine	UA136	Sink 1.60	47.41	20.54	12.80	66.66	4,021	21.66	2.17	0.23	8.01	1.53	1.27
Herendeen Bay	UA-137	Float 1.60	52.34	32.23	53.80	13.97	12,140	67.39	4.79	1.60	11.20	0.40	1.05
Coal Point	UA-137	Sink 1.60	47.66	19.29	9.60	71.11	3,432	19.06	1.69	0.49	5.97	1.82	1.68

All results on a moisture free basis.

TABLE VI

Concentration of Major Elements in Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to 65 Mesh Size, percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	SO_3
Northern Alaska Coal Fields												
No. 7 Bed	UA 139 Float 1.60	38.7	24.8	3.6	3.8	14.0	5.88	0.86	1.81	.10		4.25
Cape Beaufort	UA 139 Sink 1.60	64.3	24.0	2.0	1.5	2.7	2.36	1.22	0.55	0.02		0.35
Kokolik River	UA 126 Float 1.60	31.1	31.5	5.85	2.31	8.77	2.49	1.58	3.29	0.05	4.78	3.23
	UA 126 Sink 1.60	53.7	26.3	5.90	3.50	5.01	1.17	2.20	1.49	0.03	0.80	0.58
No. 3 Bed	UA 125 Float 1.60	17.2	30.2	8.41	3.81	12.4	4.36	0.86	1.49	0.03	0.87	11.35
Elusive Creek	UA 125 Sink 1.60	25.0	23.9	18.3	8.87	15.6	0.75	0.35	0.31	0.04	0.41	4.31
Wainwright	UA 109 Float 1.60	4.8	13.2	12.4	19.0	11.4	13.0	1.62	0.44	0.17	0.13	24.75
	UA 109 Sink 1.60	3.4	0.8	61.2	7.83	9.06	0.22	0.11	0.04	0.50	0.25	—
Meade River	UA 110 Float 1.60	38.9	34.0	6.64	4.57	5.51	2.08	2.01	1.47	0.05	1.94	0.91
	UA 110 Sink 1.60	48.6	29.2	5.97	0.68	1.94	0.14	0.92	0.57	0.03	0.69	—
Sagwon Bluffs	UA 114 Float 1.60	41.2	20.8	7.87	4.94	16.1	0.42	2.09	3.20	0.06	0.03	1.94
	UA 114 Sink 1.60	66.0	23.3	3.42	2.20	1.08	0.24	3.04	1.09	0.02	0.06	1.66
Northwest Alaska Coal Fields												
Chicago Creek	UA 138 Float 1.60	13.4	13.9	24.0	4.42	22.4	0.15	0.36	0.69	0.42	0.12	16.60
Seward Peninsula	UA 138 Sink 1.60	27.8	11.9	33.2	1.45	4.47	0.45	0.97	0.49	0.57	0.08	2.47
Unalakleet	UA 151 Float 1.60	26.5	24.0	6.02	8.78	17.2	3.27	1.25	0.73	0.03	2.00	6.13
Coal Creek	UA 151 Sink 1.60	65.1	18.0	4.20	2.08	2.38	0.96	1.93	0.92	0.02	0.65	2.02
Interior Alaska Coal Fields												
No. 2 Seam	UA 105 Float 1.60	33.2	18.1	8.03	2.91	23.9	0.15	0.55	0.84	0.41	0.58	4.12
	UA 105 Sink 1.60	54.8	20.9	3.41	0.80	4.81	0.18	1.28	0.64	0.06	0.20	0.73

TABLE VI (Continued)

Concentration of Major Elements in Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to 65 Mesh Size, percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	SO_3
Lignite Creek	UA 141 Float 1.60	38.0	19.6	10.1	5.08	21.0	0.11	1.18	0.78	0.45	0.03	5.62
	UA 141 Sink 1.60	67.1	21.0	4.06	1.62	2.80	0.56	2.34	0.63	0.07	0.03	.87
Moose Seam	UA 103 Float 1.60	36.8	25.3	3.8	6.8	15.1	2.29	0.94	1.16	.02		2.25
	UA 103 Sink 1.60	56.7	19.6	14.4	1.45	2.9	0.44	1.55	0.82	0.18		0.34
Caribou Seam	UA 104 Float 1.60	39.1	22.7	3.31	5.18	13.8	1.25	1.10	0.97	0.01	2.63	3.36
	UA 104 Sink 1.60	59.6	15.8	11.5	1.32	2.35	0.27	1.83	0.70	0.08	0.78	--
Basal Bed (A)	UA 140 Float 1.60	46.2	28.1	3.17	3.38	9.83	0.43	2.08	1.67	0.04	1.73	2.87
Arctic Mine	UA 140 Sink 1.60	64.9	24.9	3.02	1.44	2.42	0.13	2.62	1.10	0.03	0.81	0.75
No. 1 Bed	UA 129 Float 1.60	28.5	22.4	6.50	4.54	31.7	0.47	0.39	1.35	0.13	1.88	2.06
Usibelli Mine	UA 129 Sink 1.60	62.9	24.2	2.49	0.86	3.15	0.04	1.53	0.91	0.03	0.38	0.46
No. 3 Bed	UA 130 Float 1.60	10.8	8.1	12.5	5.80	46.2	0.36	0.08	0.41	0.29	0.14	3.57
Usibelli Mine	UA 130 Sink 1.60	63.5	15.7	4.22	1.05	6.01	0.21	1.46	1.07	0.07	0.04	—
Poker Flat Pit	UA 119 Float 1.60	23.1	15.0	10.1	5.53	43.1	1.09	0.40	0.73	0.14	0.10	4.18
No. 4 Seam	UA 119 Sink 1.60	49.5	18.9	9.56	2.90	17.1	0.15	1.44	0.79	0.17	0.08	2.33
No. 6 Seam	UA 100 Float 1.60	44.3	24.6	10.7	2.8	13.2	0.27	1.10	1.12		—	3.63
Top	UA 100 Sink 1.60	60.0	31.8	5.0	1.1	2.9	0.22	1.55	0.76	1.5		0
No. 6 Seam	UA 101 Float 1.60	29.8	18.5	10.9	4.12	32.1	0.43	0.61	0.82	0.38	0.11	4.05
Middle	UA 101 Sink 1.60	57.1	17.6	4.98	1.01	6.07	0.20	1.55	1.02	0.07	0.06	—
No. 6 Seam	UA 102 Float 1.60	37.1	19.9	7.40	2.45	23.7	0.10	0.60	0.84	0.18	0.05	1.83
Lower	UA 102 Sink 1.60	57.2	20.2	4.15	1.14	6.62	0.19	1.27	0.88	0.08	0.06	1.31

TABLE VI (Continued)

Concentration of Major Elements in Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to 65 Mesh Size, percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	SO_3
Marguerite Creek	UA 120 Float 1.60	28.3	15.5	6.51	6.63	40.4	0.13	0.38	0.83	0.24	0.07	3.75
	UA 120 Sink 1.60	67.6	14.8	2.73	2.18	10.6	0.17	1.01	0.82	0.09	0.08	1.11
Yanert Mine	UA 132 Float 1.60	56.0	26.6	5.50	1.69	3.09	0.36	2.68	1.54	0.05	1.02	1.33
	UA 132 Sink 1.60	66.9	23.7	3.65	1.10	0.75	0.34	2.93	0.77	0.02	0.35	.75
Jarvis Creek No. 1 Seam	UA 106 Float 1.60	19.3	14.5	14.1	2.11	22.0	0.11	0.35	1.01	0.10	0.50	22.46
	UA 106 Sink 1.60	42.6	18.1	14.7	1.25	6.07	0.14	1.16	0.70	0.03	0.28	5.08
Eagle Coal Creek	UA 121 Float 1.60	27.5	19.7	6.84	5.48	26.8	0.58	0.45	1.75	0.27	0.15	11.04
	UA 121 Sink 1.60	60.3	24.8	3.57	1.38	4.42	0.57	0.93	1.04	0.06	0.10	2.19
Eagle Chicken	UA 124 Float 1.60	42.2	27.6	14.6	2.28	4.49	0.93	0.95	1.53	0.20	2.84	2.49
	UA 124 Sink 1.60	53.8	21.1	4.19	1.14	5.35	0.52	1.54	0.54	0.04	1.43	4.73
Nulato	UA 128 Float 1.60	55.0	23.6	10.21	1.48	0.83	1.24	4.99	2.96	0.02	0.05	0.25
	UA 128 Sink 1.60	64.8	21.9	5.00	1.54	0.12	1.81	4.81	0.86	0.02	0.03	0.06
Tramway Bar	UA 117 Float 1.60	43.6	29.6	3.33	1.72	6.36	0.59	2.20	2.70	.018	2.74	1.2
	UA 117 Sink 1.60	55.2	27.6	4.97	1.18	1.16	0.68	3.54	1.34	.032	.39	0.16
Southcentral Alaska Coal Fields												
Waterfall Seam	UA 113 Float 1.60	32.5	26.6	7.5	2.3	21.9	0.77	1.22	0.85	0.08		3.55
	UA 113 Sink 1.60	57.1	30.2	4.6	1.1	3.5	0.30	2.31	0.57	0.06		0.24
Waterfall Bed Top 6'	UA 148 Float 1.60	52.9	30.6	5.69	1.15	5.42	0.19	2.44	0.89	0.08	0.33	1.74
	UA 148 Sink 1.60	62.1	29.1	3.20	0.96	0.85	0.14	2.74	0.59	0.04	0.27	2.26
Capps Bed	UA 127 Float 1.60	48.8	26.9	3.44	1.50	12.4	0.30	1.41	1.25	0.05	0.63	2.29
	UA 127 Sink 1.60	60.2	24.6	1.82	0.73	2.68	0.30	1.66	0.90	0.02	0.33	0.36

TABLE VI (Continued)

Concentration of Major Elements in Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to 65 Mesh Size, percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	SO_3
Green Bed	UA 152 Float 1.60	25.4	21.5	8.40	4.29	24.9	0.27	0.66	0.71	0.09	0.01	4.07
Lone Ridge Mine	UA 152 Sink 1.60	52.0	28.8	6.02	1.01	4.11	0.22	0.80	0.76	0.07	0.24	—
Yentna	UA 149 Float 1.60	38.4	24.6	7.2	3.6	18.1	0.41	1.46	1.13	0.14		2.79
Johnson Creek	UA 149 Sink 1.60	64.6	22.9	4.4	1.3	3.1	0.32	2.31	0.86	0.05		0.30
Yentna	UA 150 Float 1.60	45.3	31.2	3.46	1.94	9.75	0.22	1.23	1.40	0.03	0.50	2.06
Canyon Creek	UA 150 Sink 1.60	60.8	24.1	1.58	0.99	1.53	0.26	2.33	0.80	0.01	0.16	0.21
Yentna	UA 115 Float 1.60	7.2	34.3	8.43	7.43	36.1	0.11	0.15	0.89	0.10	1.52	5.32
Locality 2 Lower	UA 115 Sink 1.60	22.6	30.1	8.60	5.41	24.5	0.31	0.77	0.85	0.10	1.81	3.70
Yentna	UA 116 Float 1.60	6.54	27.8	9.83	7.47	42.1	0.13	0.10	0.61	0.13	0.68	5.91
Locality 2 Upper	UA 116 Sink 1.60	18.6	25.5	10.87	5.72	32.4	0.27	0.64	0.62	0.12	0.73	4.95
Kenai	UA 118 Float 1.60	38.0	20.7	7.87	3.20	20.0	1.26	1.61	1.14	0.22	2.09	6.03
Cabin Bed	UA 118 Sink 1.60	55.0	23.6	5.62	2.22	6.24	1.78	2.30	0.66	0.09	1.10	1.38
Kenai	UA 122 Float 1.60	38.5	19.4	6.47	8.76	16.0	5.36	1.50	1.25	0.10	1.14	3.56
Ninilchik	UA 122 Sink 1.60	61.1	22.4	6.95	2.81	2.37	1.83	2,39	0.65	0.13	0.04	0.42
Kenai	UA 131 Float 1.60	34.0	15.4	10.1	5.57	26.5	0.65	0.79	0.76	0.72	0.44	6.21
Happy Creek	UA 131 Sink 1.60	59.2	18.4	13.7	2.45	3.40	1.62	1.96	0.63	0.35	0.45	0.52
Big Seam	UA 108 Float 1.60	48.8	29.2	4.28	1.46	3.54	0.59	1.21	2.67	0.02	1.00	2.79
	UA 108 Sink 1.60	48.5	21.1	15.9	2.76	4.06	0.11	1.14	0.72	0.18	0.17	0.80
No. 7A Bed	UA 142 Float 1.60	48.9	34.8	2.6	1.0	2.3	1.25	1.40	3.90	0.01		0.16
Evan Jones Mine	UA 142 Sink 1.60	54.2	28.3	8.2	1.9	2.5	0.48	1.67	1.05	0.12		0.48
No. 7 Lower Bed	UA 143 Float 1.60	47.1	30.0	2.36	1.11	2.26	0.69	1.60	2.08	0.01	3.47	1.52
Evan Jones Mine	UA 143 Sink 1.60	39.1	27.9	19.2	2.39	4.31	0.33	0.96	1.17	0.29	3.80	0.86

TABLE VI (Continued)

Concentration of Major Elements in Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to 65 Mesh Size, percent

Coal Field	Sample No.	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	MnO	P_2O_5	SO_3
No. 7 Upper Bed	UA 144 Float 1.60	47.0	29.1	3.06	1.35	2.14	1.07	1.40	3.19	0.02	1.49	0.56
Evan Jones Mine	UA 144 Sink 1.60	48.7	25.9	16.8	2.57	2.70	0.34	1.51	0.92	0.21	1.36	1.44
No. 6 Lower Bed	UA 145 Float 1.60	53.5	33.7	2.69	1.27	2.18	0.75	1.79	2.33	0.02	3.51	1.49
Evan Jones Mine	UA 145 Sink 1.60	48.9	26.0	5.40	1.55	2.45	0.60	1.82	0.80	0.06	4.39	0.49
No. 6 Upper Bed	UA 146 Float 1.60	57.6	32.6	2.44	1.04	1.14	0.44	1.78	3.15	0.02	0.64	0.10
Evan Jones Mine	UA 146 Sink 1.60	54.0	29.0	6.34	1.25	1.74	0.28	1.59	0.98	0.09	0.32	0.60
No. 5 Bed	UA 147 Float 1.60	50.7	32.7	2.8	1.3	2.0	1.11	1.79	4.59	0.02		0.15
Evan Jones Mine	UA 147 Sink 1.60	55.8	27.5	6.9	2.1	2.6	0.58	2.01	0.74	0.12		0.32
Matanuska	UA 107 Float 1.60	49.8	32.0	3.24	1.26	2.63	0.53	1.53	2.48	0.01	1.78	2.19
Lower Seam	UA 107 Sink 1.60	54.4	27.4	5.95	1.85	3.50	0.51	1.73	0.72	0.09	1.25	0.23
Broad Pass	UA 111 Float 1.60	42.0	27.9	5.95	1.00	14.2	0.06	1.29	1.28	0.25	5.65	3.17
Coal Creek Seam	UA 111 Sink 1.60	59.3	25.9	3.23	0.79	4.04	0.24	1.98	0.98	0.08	0.31	1.11
Broad Pass	UA 123 Float 1.60	35.3	28.8	9.40	2.18	12.7	0.09	0.70	1.44	0.07	0.34	7.13
Dunkle Bed	UA 123 Sink 1.60	49.8	19.9	24.5	1.10	2.12	0.00	0.78	0.71	0.27	0.27	1.06
Southwest Alaska Coalfields												
Little Tonzona	UA 112 Float 1.60	18.9	16.2	6.68	3.78	29.8	0.06	0.60	0.68	0.03	0.18	21.07
Coal Bed	UA 112 Sink 1.60	53.5	20.2	6.92	1.82	6.82	0.52	1.52	0.90	0.04	0.21	4.92
Chignik	UA 136 Float 1.60	46.1	33.1	6.23	2.07	3.47	0.14	0.78	2.75	0.04	3.88	3.18
Chignik Bay Mine	UA 136 Sink 1.60	52.2	27.5	3.90	0.91	3.51	0.06	0.98	0.84	0.03	1.09	1.73
Herendeen Bay	UA 137 Float 1.60	48.6	20.0	11.1	1.97	4.93	1.02	1.34	1.85	0.15	0.01	1.81
Coal Point	UA 137 Sink 1.60	57.0	16.5	12.2	1.76	6.59	1.51	1.29	0.63	0.22	0.09	4.50

Table VII

Fusibility of Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to Minus 65 Mesh Size

COAL FIELD & SEAM	SAMPLE NUMBER	SPECIFIC GRAVITY	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
Northern Alaska Coal Fields					
No. 7 Bed	UA-139	Float 1.60	2148	2229	2492
Cape Beaufort		Sink 1.60	2264	2618	2721
Kokolik River	UA-126	Float 1.60	2217	2276	2328
		Sink 1.60	2305	2329	2438
No. 3 Bed	UA-125	Float 1.60	2262	2427	2571
Elusive Creek		Sink 1.60	2265	2285	2506
Wainwright	UA-109	Float 1.60	+2800	+2800	+2800
		Sink 1.60	2637	2795	2800+
Meade River	UA-110	Float 1.60	2065	2297	2352
		Sink 1.60	—	—	—
Sagwon Bluffs	UA-114	Float 1.60	2211	2226	2281
		Sink 1.60	2559	2636	2766
Northwest Alaska Coal Fields					
Chicago Creek	UA-138	Float 1.60	2407	2428	2439
Seward Peninsula		Sink 1.60	2322	2500	2565
Unalakleet	UA-151	Float 1.60	2225	2247	2314
Coal Creek		Sink 1.60	2325	2466	2596
Interior Alaska Coal Fields					
No. 2 Seam	UA-105	Float 1.60	2162	2219	2257
		Sink 1.60	2394	2504	2601
Lignite Creek	UA-141	Float 1.60	2209	2259	2285
		Sink 1.60	2266	2495	2797
Moose Seam	UA-103	Float 1.60	2166	2181	2354
		Sink 1.60	2064	2433	2493
Caribou Seam	UA-104	Float 1.60	2186	2298	2335
		Sink 1.60	2458	2518	2599
Basal Bed (A)	UA-140	Float 1.60	2215	2378	2393
Arctic Mine		Sink 1.60	2364	2552	2568

Table VII (Continued)

Fusibility of Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to Minus 65 Mesh Size

COAL FIELD & SEAM	SAMPLE NUMBER	SPECIFIC GRAVITY	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
No. 1 Bed	UA-129	Float 1.60	2394	2411	2425
Usibelli Mine		Sink 1.60	2800+	2800+	2800+
No. 3 Bed	UA-130	Float 1.60	2329	2434	2438
Usibelli Mine		Sink 1.60	2326	2377	2438
Poker Flat Pit	UA-119	Float 1.60	2479	2481	2485
No. 4 Seam		Sink 1.60	2252	2264	2368
No. 6 Seam	UA-100	Float 1.60	2093	2371	2437
Top		Sink 1.60	2151	+2800	+2800
No. 6 Seam	UA-101	Float 1.60	2168	2239	2613
Middle		Sink 1.60	2210	2361	2435
No. 6 Seam	UA-102	Float 1.60	2205	2234	2243
Lower		Sink 1.60	2362	2376	2390
Marguerite	UA-120	Float 1.60	2531	2540	2543
Creek		Sink 1.60	2324	2375	2466
Yanert Mine	UA-132	Float 1.60	2402	2604	2717
		Sink 1.60	2371	2495	+2800
Jarvis Creek	UA-106	Float 1.60	2342	2344	2352
No. 1 Seam		Sink 1.60	2302	2335	2398
Eagle	UA-121	Float 1.60	2291	2315	2345
Coal Creek		Sink 1.60	2453	2561	2667
Eagle	UA-124	Float 1.60	2429	2476	2485
Chicken		Sink 1.60	2314	2357	2567
Nulato	UA-128	Float 1.60	2185	2491	2590
		Sink 1.60	2500	2520	2695
Tramway Bar	UA-117	Float 1.60	2395	2480	2580
		Sink 1.60	2715	2800	+2800
South Central Alaska Coal Fields					
Waterfall	UA-113	Float 1.60	2182	2222	2262
Seam		Sink 1.60	2253	+2800	+2800

Table VII (Continued)

Fusibility of Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to Minus 65 Mesh Size

COAL FIELD & SEAM	SAMPLE NUMBER	SPECIFIC GRAVITY	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
Waterfall Bed	UA-148	Float 1.60	2266	2563	2721
Top 6'		Sink 1.60	+2800	+2800	+2800
Capps Bed	UA-127	Float 1.60	2195	2552	2582
		Sink 1.60	2800+	2800+	2800+
Green Bed	UA-152	Float 1.60	2170	2245	2435
Lone Ridge Mine		Sink 1.60	2800+	2800+	2800+
Yentna	UA-149	Float 1.60	2122	2303	2392
Johnson Creek		Sink 1.60	2224	2597	2704
Yentna	UA-150	Float 1.60	2567	2601	2619
Canyon Creek		Sink 1.60	2800+	2800+	2800+
Yentna	UA-115	Float 1.60	2668	2733	2771
Locality 2 Lower		Sink 1.60	—	—	—
Yentna	UA-116	Float 1.60	2552	2586	2652
Locality 2 Upper		Sink 1.60	—	—	—
Kenai	UA-118	Float 1.60	2164	2183	2199
Cabin Bed		Sink 1.60	2266	2289	2333
Kenai	UA-122	Float 1.60	2158	2172	2276
Ninilchik		Sink 1.60	2328	2428	2552
Kenai	UA-131	Float 1.60	2163	2224	2228
Happy Creek		Sink 1.60	2257	2305	2419
Big Seam	UA-108	Float 1.60	2431	2764	2790
		Sink 1.60	2344	2405	2466
No. 7A Bed	UA 142	Float 1.60	2176	+2800	+2800
Evan Jones Mine		Sink 1.60	2272	2716	2742
No. 7 Lower Bed	UA-143	Float 1.60	2366	2552	2582
Evan Jones Mine		Sink 1.60	2800+	2800+	2800+
No. 7 Upper Bed	UA-144	Float 1.60	2752	2800+	2800+
Evan Jones Mine		Sink 1.60	2324	2717	2767
No. 6 Lower Bed	UA-145	Float 1.60	2385	2666	2725
Evan Jones Mine		Sink 1.60	2800+	2800+	2800+

Table VII (Continued)

Fusibility of Ash of 1.60 Specific Gravity Float-Sink Products of Coals Crushed to Minus 65 Mesh Size

COAL FIELD & SEAM	SAMPLE NUMBER	SPECIFIC GRAVITY	INITIAL DEFORMATION °F	SOFTENING °F	FLUID °F
No. 6 Upper Bed	UA-146	Float 1.60	2800+	2800+	2800+
Evan Jones Mine		Sink 1.60	2800+	2800+	2800+
No. 5 Bed	UA-147	Float 1.60	2091	+2800	+2800
Evan Jones Mine		Sink 1.60	2554	2708	2759
Matanuska	UA-107	Float 1.60	2599	2800+	2800+
Lower Seam		Sink 1.60	2522	2670	2729
Broad Pass	UA-111	Float 1.60	2465	2473	2490
Coal Creek Seam		Sink 1.60	2427	2484	2493
Broad Pass	UA-123	Float 1.60	2430	2548	2561
Dunkle Bed		Sink 1.60	2501	2538	2543
Southwest Alaska Coal Fields					
Little Tonzona	UA-112	Float 1.60	2574	2702	2771
Coal Bed		Sink 1.60	2292	2317	2414
Chignik	UA-136	Float 1.60	2564	2800+	2800+
Chignik Bay Mine		Sink 1.60	2704	2800+	2800+
Herendeen Bay	UA-137	Float 1.60	2267	2290	2392
Coal Point		Sink 1.60	2246	2291	2439

TABLE VIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 100

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: HEALY

MINE: USIBELLI
COALBED: NO. SIX
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	10.9	13.5	10829.	6.9	0.01	0.19	10.9	13.5	10829.	6.9	0.01	0.19	0.4
1.30- 1.40	57.2	65.2	9970.	15.1	0.01	0.24	68.1	78.7	10108.	13.8	0.01	0.23	0.5
1.40- 1.60	27.0	21.3	6897.	32.4	0.01	0.30	95.1	100.0	9197.	19.1	0.01	0.25	0.5
SINK 1.60	4.9	0.0	34.	55.9	0.02	0.08	100.0	100.0	8751.	20.9	0.01	0.24	0.6
3/8 X 0													
FLOAT 1.30	24.1	28.4	11144.	7.1	0.01	0.26	24.1	28.4	11144.	7.1	0.01	0.26	0.5
1.30- 1.40	48.3	50.9	9985.	16.8	0.01	0.29	72.4	79.2	10371.	13.5	0.01	0.28	0.5
1.40- 1.60	22.1	18.2	7782.	32.7	0.01	0.26	94.6	97.4	9765.	18.0	0.01	0.28	0.6
SINK 1.60	5.4	2.6	4486.	55.0	0.02	0.12	100.0	100.0	9478.	20.0	0.01	0.27	0.6
14 M X 0													
FLOAT 1.30	4.2	5.3	11603.	3.1	0.01	0.34	4.2	5.3	11603.	3.1	0.01	0.34	0.6
1.30- 1.40	47.5	53.8	10309.	12.1	0.01	0.17	51.7	59.1	10413.	11.4	0.01	0.18	0.4
1.40- 1.60	41.5	37.2	8181.	28.7	0.01	0.22	93.2	96.4	9420.	19.1	0.01	0.20	0.4
SINK 1.60	6.8	3.6	4846.	58.5	0.03	0.07	100.0	100.0	9108.	21.8	0.01	0.19	0.4
65 M X 0													
FLOAT 1.30	0.3	0.5	11210.	5.4	0.01	0.24	0.3	0.5	11210.	5.4	0.01	0.24	0.4
1.30- 1.40	24.3	30.6	10945.	7.1	0.01	0.36	24.7	31.1	10949.	7.0	0.01	0.36	0.7
1.40- 1.60	45.2	48.2	9284.	18.3	0.01	0.30	69.9	79.3	9872.	14.3	0.01	0.32	0.6
SINK 1.60	30.1	20.7	5982.	48.6	0.01	0.36	100.0	100.0	8700.	24.6	0.01	0.33	0.8
200 M X 0													
FLOAT 1.30	0.4	0.6	11221.	5.8	0.01	0.24	0.4	0.6	11221.	5.8	0.01	0.24	0.4
1.30- 1.40	14.0	18.4	11207.	6.0	0.01	0.47	14.4	18.9	11207.	6.0	0.01	0.46	0.8
1.40- 1.60	53.4	60.1	9608.	14.7	0.01	0.30	67.8	79.0	9948.	12.9	0.01	0.33	0.7
SINK 1.60	32.2	21.0	5578.	48.5	0.01	0.21	100.0	100.0	8543.	24.3	0.01	0.29	0.7
325 M X 0													
FLOAT 1.30	0.3	0.4	11215.	5.6	0.01	0.25	0.3	0.4	11215.	5.6	0.01	0.25	0.4
1.30- 1.40	13.1	17.1	11157.	6.4	0.01	0.37	13.4	17.5	11158.	6.4	0.01	0.37	0.7
1.40- 1.60	51.8	58.5	9642.	14.1	0.01	0.25	65.3	76.0	9954.	12.5	0.01	0.27	0.6
SINK 1.60	34.7	24.0	5898.	47.7	0.01	0.24	100.0	100.0	8546.	24.8	0.01	0.26	0.6
SAMPLE MESH SIZE													
PLUS 65	2.4	2.5	9200.	19.2	0.01	0.31	2.4	2.5	9200.	19.2	0.01	0.31	0.7
65 - 200	38.2	40.7	9260.	20.1	0.01	0.29	40.5	43.3	9256.	20.0	0.01	0.29	0.6
200 - 325	22.6	23.1	8872.	23.7	0.01	0.33	63.1	66.4	9119.	21.4	0.01	0.31	0.7
MINUS 325	36.9	33.6	7905.	30.6	0.01	0.25	100.0	100.0	8671.	24.8	0.01	0.28	0.7

TABLE IX
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 101

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: HEALY

MINE: USIBELLI
COALBED: NO. SIX
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	40.5	42.3	11430.	6.5	0.01	0.13	40.5	42.3	11430.	6.5	0.01	0.13	0.2
1.30- 1.40	56.0	55.2	10789.	10.5	0.01	0.16	96.5	97.5	11058.	8.8	0.01	0.15	0.3
1.40- 1.60	3.3	2.4	8015.	30.1	0.01	0.23	99.8	99.9	10957.	9.5	0.01	0.15	0.3
SINK 1.60	0.2	0.1	5405.	46.3	0.02	0.14	100.0	100.0	10944.	9.6	0.01	0.15	0.3
3/8 X 0													
FLOAT 1.30	40.6	41.5	11102.	6.8	0.01	0.14	40.6	41.5	11102.	6.8	0.01	0.14	0.3
1.30- 1.40	56.2	55.5	10712.	10.3	0.01	0.21	96.8	97.0	10876.	8.8	0.01	0.18	0.3
1.40- 1.60	2.9	2.8	10361.	24.4	0.01	0.19	99.7	99.8	10861.	9.3	0.01	0.18	0.3
SINK 1.60	0.3	0.2	7617.	29.8	0.03	0.05	100.0	100.0	10851.	9.3	0.01	0.18	0.3
14 M X 0													
FLOAT 1.30	28.6	30.1	11205.	6.0	0.01	0.12	28.6	30.1	11205.	6.0	0.01	0.12	0.2
1.30- 1.40	67.3	66.8	10581.	9.7	0.01	0.16	95.9	96.9	10767.	8.6	0.01	0.15	0.3
1.40- 1.60	3.2	2.6	8728.	21.7	0.01	0.15	99.1	99.5	10702.	9.0	0.01	0.15	0.3
SINK 1.60	0.9	0.5	5633.	43.1	0.03	0.08	100.0	100.0	10656.	9.3	0.01	0.15	0.3
65 M X 0													
FLOAT 1.30	0.1	0.1	11863.	2.2	0.01	0.19	0.1	0.1	11863.	2.2	0.01	0.19	0.3
1.30- 1.40	46.0	49.2	11220.	5.6	0.01	0.19	46.1	49.3	11221.	5.6	0.01	0.19	0.3
1.40- 1.60	46.0	45.2	10313.	9.9	0.01	0.21	92.1	94.5	10768.	7.7	0.01	0.20	0.4
SINK 1.60	7.9	5.5	7375.	29.1	0.02	0.20	100.0	100.0	10501.	9.4	0.01	0.20	0.4
SAMPLE MESH SIZE													
PLUS 65	14.4	14.3	10687.	8.2	0.01	0.19	14.4	14.3	10687.	8.2	0.01	0.19	0.4
65 - 100	15.8	15.8	10715.	8.1	0.01	0.19	30.2	30.1	10702.	8.2	0.01	0.19	0.4
100 - 200	27.8	28.8	11099.	8.3	0.01	0.20	58.0	58.9	10892.	8.2	0.01	0.19	0.4
200 - 325	13.3	13.1	10589.	8.9	0.01	0.20	71.3	72.0	10836.	8.4	0.01	0.20	0.4
MINUS 325	28.7	28.0	10481.	10.6	0.01	0.20	100.0	100.0	10734.	9.0	0.01	0.20	0.4

TABLE X
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 102

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: HEALY

MINE: USIBELLI
COALBED: NO. SIX
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	14.3	15.0	10438.	8.9	0.01	0.16	14.3	15.0	10438.	8.9	0.01	0.16	0.3
1.30- 1.40	81.5	82.1	10039.	12.6	0.01	0.16	95.8	97.1	10098.	12.1	0.01	0.16	0.3
1.40- 1.60	3.0	2.4	7766.	29.6	0.01	0.18	98.8	99.5	10027.	12.6	0.01	0.16	0.3
SINK 1.60	1.2	0.5	4238.	54.3	0.02	0.07	100.0	100.0	9959.	13.1	0.01	0.16	0.3
3/8 X 0													
FLOAT 1.30	19.8	20.9	10645.	9.1	0.01	0.13	19.8	20.9	10645.	9.1	0.01	0.13	0.2
1.30- 1.40	73.5	73.7	10118.	13.4	0.01	0.19	93.3	94.6	10230.	12.5	0.01	0.18	0.3
1.40- 1.60	5.0	4.5	9080.	20.3	0.01	0.20	98.3	99.1	10171.	12.9	0.01	0.18	0.4
SINK 1.60	1.7	0.9	5043.	50.6	0.02	0.07	100.0	100.0	10082.	13.5	0.01	0.18	0.4
14 M X 0													
FLOAT 1.30	4.1	4.3	10583.	6.8	0.01	0.16	4.1	4.3	10583.	6.8	0.01	0.16	0.3
1.30- 1.40	89.3	90.4	10056.	12.8	0.01	0.23	93.4	94.7	10079.	12.5	0.01	0.23	0.5
1.40- 1.60	5.3	4.6	8680.	25.7	0.01	0.17	98.7	99.3	10004.	13.2	0.01	0.22	0.4
SINK 1.60	1.3	0.7	5265.	60.0	0.02	0.07	100.0	100.0	9942.	13.8	0.01	0.22	0.4
65 M X 0													
FLOAT 1.30	0.1	0.1	11735.	2.0	0.01	0.22	0.1	0.1	11735.	2.0	0.01	0.22	0.4
1.30- 1.40	3.8	4.4	11325.	5.5	0.01	0.23	3.9	4.5	11337.	5.4	0.01	0.23	0.4
1.40- 1.60	87.7	89.4	9935.	12.2	0.01	0.23	91.5	93.9	9994.	11.9	0.01	0.23	0.5
SINK 1.60	8.5	6.1	7024.	36.1	0.02	0.24	100.0	100.0	9743.	13.9	0.01	0.23	0.5
SAMPLE MESH SIZE													
PLUS 65	7.4	7.3	9855.	13.4	0.01	0.23	7.4	7.3	9855.	13.4	0.01	0.23	0.5
65 - 100	10.0	9.9	9830.	13.9	0.01	0.22	17.3	17.2	9841.	13.7	0.01	0.22	0.5
100 - 200	29.1	28.5	9749.	13.8	0.01	0.21	46.4	45.7	9783.	13.7	0.01	0.22	0.4
200 - 325	37.0	36.2	9718.	15.0	0.01	0.22	83.5	81.9	9754.	14.3	0.01	0.22	0.4
MINUS 325	28.7	30.2	10481.	10.6	0.01	0.20	100.0	100.0	9940.	13.3	0.01	0.21	0.4

TABLE XI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 103

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: USIBELLI

MINE: USIBELLI
COALBED: MOOSE
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	65.7	67.8	11847.	6.8	0.01	0.21	65.7	67.8	11847.	6.8	0.01	0.21	0.4
1.30- 1.40	32.2	30.7	10952.	12.4	0.01	0.21	97.9	98.6	11552.	8.6	0.01	0.21	0.4
1.40- 1.60	1.4	1.1	9181.	28.2	0.02	0.17	99.3	99.7	11519.	8.9	0.01	0.21	0.4
SINK 1.60	0.7	0.3	5669.	45.0	0.13	0.15	100.0	100.0	11479.	9.1	0.01	0.21	0.4
3/8 X 0													
FLOAT 1.30	81.2	82.7	11798.	7.8	0.01	0.21	81.2	82.7	11798.	7.8	0.01	0.21	0.4
1.30- 1.40	16.4	15.6	11042.	11.6	0.02	0.21	97.5	98.3	11671.	8.4	0.01	0.21	0.4
1.40- 1.60	1.6	1.2	9080.	27.5	0.03	0.15	99.1	99.6	11630.	8.7	0.01	0.21	0.4
SINK 1.60	0.9	0.4	5580.	46.5	0.13	0.17	100.0	100.0	11577.	9.1	0.01	0.21	0.4
14 M X 0													
FLOAT 1.30	59.0	60.2	11804.	6.6	0.01	0.20	59.0	60.2	11804.	6.6	0.01	0.20	0.3
1.30- 1.40	37.9	37.4	11445.	10.1	0.01	0.20	96.9	97.6	11664.	7.9	0.01	0.20	0.3
1.40- 1.60	2.3	1.9	9476.	23.2	0.01	0.16	99.2	99.5	11612.	8.3	0.01	0.20	0.3
SINK 1.60	0.8	0.5	6733.	40.1	0.09	0.15	100.0	100.0	11574.	8.6	0.01	0.20	0.3
65 M X 0													
FLOAT 1.30	0.2	0.2	11881.	5.9	0.01	0.32	0.2	0.2	11881.	5.9	0.01	0.32	0.5
1.30- 1.40	91.2	93.0	12167.	6.9	0.01	0.31	91.4	93.1	12166.	6.9	0.01	0.31	0.5
1.40- 1.60	6.6	5.8	10595.	18.1	0.01	0.34	97.9	99.0	12061.	7.6	0.01	0.31	0.5
SINK 1.60	2.1	1.0	5998.	53.1	0.06	0.32	100.0	100.0	11936.	8.6	0.01	0.31	0.5
200 M X 0													
FLOAT 1.30	0.4	0.4	12537.	5.0	0.01	0.32	0.4	0.4	12537.	5.0	0.01	0.32	0.5
1.30- 1.40	35.6	37.3	12239.	5.8	0.01	0.32	36.0	37.7	12242.	5.7	0.01	0.32	0.5
1.40- 1.60	60.8	60.1	11534.	8.7	0.01	0.30	96.8	97.9	11797.	7.6	0.01	0.31	0.5
SINK 1.60	3.2	2.1	7665.	35.6	0.06	0.36	100.0	100.0	11663.	8.5	0.01	0.31	0.5
325 M X 0													
FLOAT 1.30	0.3	0.3	12667.	4.7	0.01	0.32	0.3	0.3	12667.	4.7	0.01	0.32	0.5
1.30- 1.40	27.0	27.7	12417.	5.6	0.01	0.32	27.2	28.0	12428.	5.6	0.01	0.32	0.5
1.40- 1.60	69.1	69.6	12151.	8.3	0.01	0.35	96.3	97.6	12227.	7.5	0.01	0.34	0.6
SINK 1.60	3.7	2.4	7953.	35.8	0.07	0.32	100.0	100.0	12070.	8.6	0.01	0.34	0.6
SAMPLE MESH SIZE													
PLUS 65	2.4	2.4	11448.	9.2	0.01	0.23	2.4	2.4	11448.	9.2	0.01	0.23	0.4
65 - 200	49.7	49.5	11224.	8.4	0.01	0.24	52.0	51.9	11234.	8.4	0.01	0.24	0.4
200 - 325	23.0	23.2	11368.	8.6	0.01	0.25	75.0	75.1	11275.	8.5	0.01	0.24	0.4
MINUS 325	25.0	24.9	11211.	9.9	0.01	0.22	100.0	100.0	11259.	8.8	0.01	0.24	0.4

TABLE XII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 104

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: USIBELLI

MINE: USIBELLI
COALBED: CARIBOU
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	40.8	43.4	11592.	6.9	0.01	0.23	40.8	43.4	11592.	6.9	0.01	0.23	0.4
1.30- 1.40	52.9	53.1	10937.	11.6	0.01	0.25	93.7	96.5	11222.	9.6	0.01	0.24	0.4
1.40- 1.60	2.9	2.4	9188.	24.7	0.03	0.18	96.6	98.9	11162.	10.0	0.01	0.24	0.4
SINK 1.60	3.4	1.1	3460.	66.4	0.12	0.14	100.0	100.0	10897.	11.9	0.01	0.24	0.4
3/8 X 0													
FLOAT 1.30	40.8	42.9	11704.	7.1	0.01	0.21	40.8	42.9	11704.	7.1	0.01	0.21	0.4
1.30- 1.40	52.0	51.8	11072.	10.8	0.01	0.21	92.7	94.7	11350.	9.2	0.01	0.21	0.4
1.40- 1.60	4.6	4.1	9916.	19.9	0.02	0.21	97.3	98.8	11282.	9.7	0.01	0.21	0.4
SINK 1.60	2.7	1.2	5008.	52.5	0.12	0.14	100.0	100.0	11114.	10.8	0.01	0.21	0.4
14 M X 0													
FLOAT 1.30	48.0	51.1	11916.	7.3	0.01	0.24	48.0	51.1	11916.	7.3	0.01	0.24	0.4
1.30- 1.40	47.7	45.9	10792.	12.1	0.01	0.22	95.6	97.0	11356.	9.7	0.01	0.23	0.4
1.40- 1.60	3.0	2.5	9221.	24.7	0.01	0.22	98.7	99.5	11291.	10.2	0.01	0.23	0.4
SINK 1.60	1.3	0.5	4166.	58.1	0.12	0.16	100.0	100.0	11195.	10.8	0.01	0.23	0.4
65 M X 0													
FLOAT 1.30	0.1	0.2	12031.	3.4	0.01	0.26	0.1	0.2	12031.	3.4	0.01	0.26	0.4
1.30- 1.40	67.6	70.9	11614.	6.8	0.01	0.26	67.7	71.1	11615.	6.8	0.01	0.26	0.4
1.40- 1.60	27.4	26.2	10568.	14.4	0.01	0.26	95.1	97.3	11313.	9.0	0.01	0.26	0.5
SINK 1.60	4.9	2.7	6202.	46.8	0.12	0.19	100.0	100.0	11065.	10.8	0.02	0.26	0.5
SAMPLE MESH SIZE													
PLUS 65	9.1	9.2	11111.	9.9	0.01	0.26	9.1	9.2	11111.	9.9	0.01	0.26	0.5
65 - 100	15.1	15.4	11190.	9.8	0.01	0.26	24.2	24.6	11160.	9.8	0.01	0.26	0.5
100 - 200	35.1	35.7	11154.	9.7	0.01	0.26	59.4	60.3	11157.	9.7	0.01	0.26	0.5
200 - 325	14.7	15.0	11168.	9.9	0.01	0.25	74.1	75.2	11159.	9.8	0.01	0.26	0.5
MINUS 325	25.9	24.8	10512.	14.9	0.01	0.25	100.0	100.0	10991.	11.1	0.01	0.26	0.5

TABLE XIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 105

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: USIBELLI

MINE: USIBELLI
COALBED: NO. TWO
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	68.7	72.2	11566.	6.5	0.01	0.18	68.7	72.2	11566.	6.5	0.01	0.18	0.3
1.30- 1.40	24.7	23.3	10356.	12.5	0.01	0.21	93.4	95.5	11246.	8.1	0.01	0.19	0.3
1.40- 1.60	5.1	3.8	8254.	30.8	0.02	0.26	98.5	99.3	11091.	9.3	0.01	0.19	0.3
SINK 1.60	1.5	0.7	5262.	51.8	0.07	0.26	100.0	100.0	11005.	9.9	0.01	0.19	0.4
3/8 X 0													
FLOAT 1.30	63.4	65.8	11475.	5.9	0.01	0.16	63.4	65.8	11475.	5.9	0.01	0.16	0.3
1.30- 1.40	27.5	26.9	10849.	10.4	0.02	0.20	90.9	92.7	11286.	7.2	0.01	0.17	0.3
1.40- 1.60	7.3	6.2	9424.	23.9	0.02	0.27	98.2	99.0	11147.	8.5	0.01	0.18	0.3
SINK 1.60	1.8	1.0	6213.	41.2	0.05	0.26	100.0	100.0	11057.	9.1	0.01	0.18	0.3
14 M X 0													
FLOAT 1.30	12.3	13.2	11638.	3.8	0.01	0.13	12.3	13.2	11638.	3.8	0.01	0.13	0.2
1.30- 1.40	75.2	76.3	10997.	7.1	0.02	0.18	87.5	89.5	11087.	6.6	0.02	0.17	0.3
1.40- 1.60	9.7	8.9	9969.	23.6	0.04	0.23	97.2	98.5	10975.	8.3	0.02	0.18	0.3
SINK 1.60	2.8	1.5	6015.	56.0	0.13	0.37	100.0	100.0	10838.	9.6	0.02	0.18	0.3
65 M X 0													
FLOAT 1.30	0.2	0.2	11787.	2.5	0.01	0.22	0.2	0.2	11787.	2.5	0.01	0.22	0.4
1.30- 1.40	62.2	64.6	10927.	5.1	0.01	0.23	62.4	64.8	10929.	5.1	0.01	0.23	0.4
1.40- 1.60	32.6	31.6	10216.	12.7	0.01	0.26	95.0	96.4	10685.	7.7	0.01	0.24	0.4
SINK 1.60	5.0	3.6	7442.	42.2	0.05	0.53	100.0	100.0	10522.	9.4	0.01	0.25	0.5
SAMPLE MESH SIZE													
PLUS 65	9.4	9.4	10822.	8.6	0.01	0.23	9.4	9.4	10822.	8.6	0.01	0.23	0.4
65 - 100	13.5	13.5	10823.	8.7	0.01	0.24	22.9	22.9	10823.	8.6	0.01	0.24	0.4
100 - 200	32.9	33.1	10893.	8.5	0.01	0.22	55.8	56.0	10864.	8.6	0.01	0.23	0.4
200 - 325	16.6	16.9	11023.	8.8	0.01	0.24	72.3	72.9	10900.	8.6	0.01	0.23	0.4
MINUS 325	27.7	27.1	10600.	11.3	0.01	0.23	100.0	100.0	10817.	9.3	0.01	0.23	0.4

TABLE XIV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 106

STATE: ALASKA
COUNTY: SOUTH EAST FAIRBANKS
TOWN: DELTA JUNCTION

MINE: DELTA COAL
COALBED: MINE
COMPANY: DELTA COAL CO

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	25.4	27.2	11546.	8.0	0.08	0.97	25.4	27.2	11546.	8.0	0.08	0.97	1.7
1.30- 1.40	61.8	62.3	10882.	10.1	0.38	1.36	87.2	89.5	11076.	9.5	0.29	1.25	2.3
1.40- 1.60	10.8	9.4	9388.	20.0	0.90	1.20	98.0	98.9	10890.	10.6	0.36	1.24	2.3
SINK 1.60	2.0	1.1	5798.	47.4	1.11	1.24	100.0	100.0	10787.	11.4	0.37	1.24	2.3
3/8 X 0													
FLOAT 1.30	25.7	27.3	11554.	7.8	0.08	1.01	25.7	27.3	11554.	7.8	0.08	1.01	1.7
1.30- 1.40	56.9	57.7	11037.	9.1	0.29	1.31	82.6	84.9	11198.	8.7	0.22	1.22	2.2
1.40- 1.60	14.9	13.5	9902.	16.6	0.86	1.02	97.5	98.5	11000.	9.9	0.32	1.19	2.2
SINK 1.60	2.5	1.5	6675.	41.7	1.12	2.32	100.0	100.0	10892.	10.7	0.34	1.21	2.2
14 M X 0													
FLOAT 1.30	2.6	2.8	12177.	8.6	0.08	0.88	2.6	2.8	12177.	8.6	0.08	0.88	1.4
1.30- 1.40	82.3	84.1	11244.	9.4	0.29	0.98	84.9	86.9	11272.	9.4	0.28	0.98	1.7
1.40- 1.60	12.6	11.6	10169.	15.7	0.92	1.98	97.4	98.6	11130.	10.2	0.37	1.11	2.0
SINK 1.60	2.6	1.4	6198.	44.6	1.16	2.62	100.0	100.0	11003.	11.1	0.39	1.15	2.1
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	39.8	42.6	11413.	6.8	0.09	0.90	39.8	42.6	11413.	6.8	0.09	0.90	1.6
1.40- 1.60	53.3	52.1	10396.	10.6	0.43	1.34	93.1	94.7	10831.	9.0	0.28	1.15	2.1
SINK 1.60	6.9	5.3	8174.	29.1	2.00	3.13	100.0	100.0	10648.	10.4	0.40	1.29	2.4
SAMPLE MESH SIZE													
PLUS 65	8.0	8.1	10707.	10.4	0.36	1.28	8.0	8.1	10707.	10.4	0.36	1.28	2.4
65 - 100	14.4	14.6	10696.	10.3	0.39	1.21	22.4	22.7	10700.	10.3	0.38	1.24	2.3
100 - 200	32.3	32.7	10686.	10.3	0.39	1.26	54.7	55.4	10692.	10.3	0.39	1.25	2.3
200 - 325	16.7	17.0	10680.	10.8	0.43	1.26	71.4	72.4	10689.	10.4	0.40	1.25	2.3
MINUS 325	28.6	27.6	10193.	15.3	0.72	1.48	100.0	100.0	10547.	11.8	0.47	1.30	2.5

TABLE XV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 107

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: CHICKALOON

MINE: CASTLE MTN
COALBED: LOWER
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	46.5	54.8	14712.	5.5	0.02	0.51	46.5	54.8	14712.	5.5	0.02	0.51	0.7
1.30- 1.40	24.0	26.3	13741.	12.1	0.03	0.48	70.4	81.1	14382.	7.7	0.02	0.50	0.7
1.40- 1.60	13.5	12.1	11262.	27.8	0.05	0.43	83.9	93.2	13881.	10.9	0.03	0.49	0.7
SINK 1.60	16.1	6.8	5254.	58.7	0.15	0.40	100.0	100.0	12492.	18.6	0.05	0.47	0.8
3/8 X 0													
FLOAT 1.30	40.6	47.8	14687.	7.5	0.02	0.49	40.6	47.8	14687.	7.5	0.02	0.49	0.7
1.30- 1.40	29.5	33.2	14031.	9.4	0.02	0.49	70.1	81.0	14411.	8.3	0.02	0.49	0.7
1.40- 1.60	13.0	11.8	11269.	25.5	0.03	0.44	83.1	92.7	13919.	11.0	0.02	0.48	0.7
SINK 1.60	16.9	7.3	5346.	57.5	0.13	0.29	100.0	100.0	12467.	18.9	0.04	0.45	0.7
14 M X 0													
FLOAT 1.30	45.5	54.6	14733.	5.6	0.02	0.47	45.5	54.6	14733.	5.6	0.02	0.47	0.6
1.30- 1.40	20.2	22.3	13592.	12.1	0.03	0.49	65.7	76.9	14382.	7.6	0.02	0.48	0.7
1.40- 1.60	18.5	16.6	10990.	26.9	0.06	0.43	84.2	93.5	13636.	11.8	0.03	0.47	0.7
SINK 1.60	15.8	6.5	5017.	59.7	0.18	0.29	100.0	100.0	12273.	19.4	0.05	0.44	0.7
65 M X 0													
FLOAT 1.30	39.7	46.7	14889.	2.2	0.02	0.52	39.7	46.7	14889.	2.2	0.02	0.52	0.7
1.30- 1.40	29.6	33.2	14178.	8.1	0.03	0.48	69.3	79.9	14585.	4.7	0.02	0.50	0.7
1.40- 1.60	13.0	12.3	11922.	21.7	0.09	0.42	82.4	92.2	14164.	7.4	0.03	0.49	0.7
SINK 1.60	17.6	7.8	5600.	62.0	0.21	0.26	100.0	100.0	12654.	17.0	0.07	0.45	0.7
SAMPLE MESH SIZE													
PLUS 65	2.2	2.0	11481.	25.2	0.05	0.42	2.2	2.0	11481.	25.2	0.05	0.42	0.7
65 - 100	5.3	4.8	11630.	23.5	0.05	0.43	7.5	6.8	11586.	24.0	0.05	0.43	0.7
100 - 200	21.4	20.5	12230.	19.6	0.05	0.42	28.9	27.3	12063.	20.8	0.05	0.42	0.7
200 - 325	16.6	16.6	12793.	16.2	0.05	0.42	45.6	43.9	12330.	19.1	0.05	0.42	0.7
MINUS 325	54.4	56.1	13188.	16.0	0.11	0.46	100.0	100.0	12797.	17.4	0.07	0.43	0.7

TABLE XVI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 108

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SUTTON

MINE: PREMIER
COALBED: BIG
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	45.5	53.5	13847.	2.8	0.01	0.42	45.5	53.5	13847.	2.8	0.01	0.42	0.6
1.30- 1.40	21.4	23.0	12676.	9.6	0.01	0.41	66.9	76.4	13473.	5.0	0.01	0.42	0.6
1.40- 1.60	17.9	15.7	10304.	25.3	0.02	0.35	84.8	92.1	12802.	9.3	0.01	0.40	0.6
SINK 1.60	15.2	7.9	6102.	50.8	0.01	0.16	100.0	100.0	11784.	15.6	0.01	0.37	0.6
3/8 X 0													
FLOAT 1.30	46.3	53.6	13671.	3.1	0.02	0.43	46.3	53.6	13671.	3.1	0.02	0.43	0.6
1.30- 1.40	25.5	27.8	12877.	7.8	0.01	0.39	71.8	81.5	13389.	4.8	0.02	0.42	0.6
1.40- 1.60	12.9	10.7	9798.	28.2	0.02	0.32	84.7	92.2	12843.	8.3	0.02	0.40	0.6
SINK 1.60	15.3	7.8	6028.	50.7	0.08	0.16	100.0	100.0	11801.	14.8	0.03	0.36	0.6
14 M X 0													
FLOAT 1.30	49.2	56.6	13661.	3.0	0.01	0.42	49.2	56.6	13661.	3.0	0.01	0.42	0.6
1.30- 1.40	26.1	28.2	12825.	9.0	0.01	0.42	75.3	84.7	13371.	5.1	0.01	0.42	0.6
1.40- 1.60	10.0	8.6	10270.	26.3	0.02	0.30	85.2	93.3	13008.	7.6	0.01	0.41	0.6
SINK 1.60	14.8	6.7	5359.	58.3	0.07	0.16	100.0	100.0	11879.	15.1	0.02	0.37	0.6
65 M X 0													
FLOAT 1.30	24.9	29.9	14028.	1.7	0.01	0.43	24.9	29.9	14028.	1.7	0.01	0.43	0.6
1.30- 1.40	42.5	49.6	13651.	3.8	0.01	0.43	67.4	79.5	13790.	3.0	0.01	0.43	0.6
1.40- 1.60	14.1	13.3	11031.	20.6	0.03	0.37	81.5	92.8	13314.	6.1	0.01	0.42	0.6
SINK 1.60	18.5	7.2	4565.	56.9	0.14	0.17	100.0	100.0	11694.	15.5	0.04	0.37	0.6
SAMPLE MESH SIZE													
PLUS 65	3.5	3.3	11159.	18.5	0.09	0.35	3.5	3.3	11159.	18.5	0.09	0.35	0.6
65 - 100	9.4	9.2	11487.	16.8	0.09	0.37	12.9	12.5	11398.	17.3	0.09	0.36	0.6
100 - 200	29.0	29.6	11948.	13.9	0.08	0.38	41.9	42.1	11779.	14.9	0.08	0.38	0.6
200 - 325	20.0	21.0	12373.	11.7	0.09	0.41	61.9	63.1	11970.	13.9	0.09	0.39	0.6
MINUS 325	38.1	36.9	11358.	17.1	0.10	0.36	100.0	100.0	11737.	15.1	0.09	0.38	0.6

TABLE XVII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 109

STATE: ALASKA
COUNTY: BARROW-POINT HOPE
TOWN: WAINWRIGHT

MINE: MINE NO. 2
COALBED: 5 FT BED
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	65.3	69.6	12516.	2.5	0.04	0.24	65.3	69.6	12516.	2.5	0.04	0.24	0.4
1.30- 1.40	26.4	26.2	11649.	6.0	0.08	0.32	91.8	95.8	12266.	3.5	0.05	0.26	0.4
1.40- 1.60	2.9	2.3	9473.	17.6	0.27	0.39	94.7	98.2	12181.	3.9	0.06	0.27	0.4
SINK 1.60	5.3	1.8	4039.	46.5	0.47	0.57	100.0	100.0	11747.	6.2	0.08	0.28	0.5
MINUS 100	0.9	0.9	10738.	14.5	0.36	1.18	100.0	100.0	11737.	6.3	0.08	0.29	0.5
3/8 X 0													
FLOAT 1.30	63.6	67.8	12480.	2.1	0.01	0.31	63.6	67.8	12480.	2.1	0.01	0.31	0.5
1.30- 1.40	27.5	27.9	11860.	4.1	0.04	0.32	91.1	95.7	12293.	2.7	0.02	0.31	0.5
1.40- 1.60	3.5	3.0	10206.	14.2	0.18	0.29	94.6	98.7	12216.	3.1	0.02	0.31	0.5
SINK 1.60	5.4	1.3	2767.	53.8	0.69	0.73	100.0	100.0	11706.	5.8	0.06	0.33	0.6
MINUS 100	5.6	5.6	11667.	7.9	0.15	0.56	100.0	100.0	11704.	5.9	0.07	0.35	0.6
14 M X 0													
FLOAT 1.30	18.6	19.9	12353.	2.4	0.03	0.25	18.6	19.9	12353.	2.4	0.03	0.25	0.4
1.30- 1.40	67.7	71.2	12200.	2.5	0.02	0.32	86.3	91.1	12233.	2.5	0.02	0.30	0.5
1.40- 1.60	7.8	7.7	11446.	6.4	0.11	0.31	94.2	98.8	12167.	2.8	0.03	0.31	0.5
SINK 1.60	5.8	1.2	2376.	57.2	0.73	0.80	100.0	100.0	11595.	6.0	0.07	0.33	0.6
65 M X 0													
FLOAT 1.30	0.8	0.9	12283.	1.1	0.01	0.25	0.8	0.9	12283.	1.1	0.01	0.25	0.4
1.30- 1.40	78.5	83.4	12051.	1.9	0.01	0.33	79.3	84.3	12053.	1.9	0.01	0.33	0.5
1.40- 1.60	12.1	12.6	11802.	3.5	0.04	0.35	91.5	96.9	12020.	2.1	0.01	0.33	0.6
SINK 1.60	8.5	3.1	4087.	48.2	0.05	0.72	100.0	100.0	11343.	6.0	0.02	0.37	0.6
SAMPLE MESH SIZE													
PLUS 65	4.1	4.3	12080.	2.6	0.07	0.34	4.1	4.3	12080.	2.6	0.07	0.34	0.6
65 - 100	9.7	10.0	11915.	4.1	0.07	0.34	13.8	14.3	11964.	3.7	0.07	0.34	0.6
100 - 200	32.6	32.9	11644.	5.0	0.08	0.34	46.4	47.3	11739.	4.6	0.08	0.34	0.6
200 - 325	19.1	19.2	11566.	5.5	0.07	0.34	65.5	66.4	11689.	4.9	0.07	0.34	0.6
MINUS 325	34.5	33.6	11200.	7.3	0.11	0.38	100.0	100.0	11520.	5.7	0.08	0.35	0.6

TABLE XVIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 110

STATE: ALASKA
COUNTY: BARROW-POINT HOPE
TOWN: ATKASOOK

MINE: MEADE RIVER
COALBED: NO. TWO
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU TOTAL	DIRECT ASH BTU/LB	DIRECT ASH MM BTU	DIRECT SULFUR PYR	DIRECT SULFUR MM BTU	CUMULATIVE RECOVERY WEIGHT TOTAL	CUMULATIVE RECOVERY BTU TOTAL	CUMULATIVE ASH BTU/LB	CUMULATIVE ASH MM BTU	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR MM BTU	CUMULATIVE LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	78.4	80.9	13155.	2.3	0.03	0.46	78.4	80.9	13155.	2.3	0.03	0.46	0.7
1.30- 1.40	18.5	16.9	11681.	11.8	0.03	0.51	96.9	97.9	12874.	4.1	0.03	0.47	0.7
1.40- 1.60	2.8	2.0	9136.	28.9	0.03	0.40	99.7	99.9	12769.	4.8	0.03	0.47	0.7
SINK 1.60	0.3	0.1	4826.	56.7	0.07	0.28	100.0	100.0	12748.	4.9	0.03	0.47	0.7
MINUS 100	1.5	0.9	7604.	37.8	0.79	1.40	100.0	100.0	12674.	5.4	0.04	0.48	0.8
3/8 X 0													
FLOAT 1.30	74.9	77.4	13194.	2.1	0.02	0.48	74.9	77.4	13194.	2.1	0.02	0.48	0.7
1.30- 1.40	19.2	18.3	12161.	9.4	0.05	0.55	94.1	95.7	12983.	3.6	0.03	0.49	0.8
1.40- 1.60	3.9	3.0	9642.	27.2	0.05	0.43	98.0	98.6	12849.	4.5	0.03	0.49	0.8
SINK 1.60	0.9	0.4	4952.	56.3	0.10	0.28	99.0	99.0	12774.	5.0	0.03	0.49	0.8
MINUS 100	5.3	4.5	10882.	16.3	0.38	0.86	100.0	100.0	12679.	5.6	0.05	0.51	0.8
14 M X 0													
FLOAT 1.30	62.0	65.2	13587.	2.0	0.02	0.36	62.0	65.2	13587.	2.0	0.02	0.36	0.5
1.30- 1.40	26.4	27.3	13364.	2.5	0.02	0.34	88.4	92.5	13520.	2.2	0.02	0.35	0.5
1.40- 1.60	7.6	6.8	11503.	11.9	0.08	0.46	96.0	99.3	13360.	2.9	0.02	0.36	0.5
SINK 1.60	4.0	0.7	2201.	57.8	1.50	1.70	100.0	100.0	12914.	5.1	0.08	0.42	0.6
65 M X 0													
FLOAT 1.30	0.8	0.8	13169.	0.6	0.01	0.68	0.8	0.8	13169.	0.6	0.01	0.68	1.0
1.30- 1.40	29.5	30.9	12965.	2.3	0.01	0.65	30.3	31.7	12970.	2.3	0.01	0.65	1.0
1.40- 1.60	63.8	64.8	12621.	2.9	0.02	0.67	94.1	96.5	12733.	2.7	0.02	0.66	1.0
SINK 1.60	5.9	3.5	7279.	45.0	1.40	1.86	100.0	100.0	12409.	5.2	0.10	0.73	1.2
SAMPLE MESH SIZE													
PLUS 65	2.8	2.8	12212.	0.4	0.01	0.62	2.8	2.8	12212.	0.4	0.01	0.62	1.0
65 - 100	9.7	9.9	12727.	2.4	0.01	0.61	12.6	12.7	12610.	2.0	0.01	0.61	1.0
100 - 200	26.0	26.5	12649.	2.6	0.02	0.61	38.6	39.2	12636.	2.4	0.02	0.61	1.0
200 - 325	19.6	19.9	12632.	2.9	0.03	0.63	58.2	59.1	12635.	2.6	0.02	0.62	1.0
MINUS 325	41.8	40.9	12154.	8.8	0.12	0.70	100.0	100.0	12434.	5.2	0.05	0.64	1.0

TABLE XIX
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 111

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: BROAD PASS

MINE: COAL CREEK
COALBED: COAL CREEK
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	34.7	42.5	11172.	4.2	0.01	0.21	34.7	42.5	11172.	4.2	0.01	0.21	0.4
1.30- 1.40	47.6	47.2	9040.	16.7	0.02	0.22	82.3	89.7	9939.	11.4	0.02	0.22	0.4
1.40- 1.60	10.6	7.8	6716.	35.5	0.03	0.13	92.9	97.5	9570.	14.2	0.02	0.21	0.4
SINK 1.60	7.1	2.5	3198.	65.5	0.05	0.08	100.0	100.0	9116.	17.8	0.02	0.20	0.4
MINUS 100	1.9	1.4	6571.	36.9	0.01	0.10	100.0	100.0	9069.	18.2	0.02	0.20	0.4
3/8 X 0													
FLOAT 1.30	31.3	38.4	11389.	4.2	0.01	0.20	31.3	38.4	11389.	4.2	0.01	0.20	0.4
1.30- 1.40	47.5	48.2	9402.	14.8	0.04	0.30	78.7	86.7	10191.	10.6	0.03	0.26	0.5
1.40- 1.60	13.1	10.3	7226.	31.2	0.04	0.11	91.9	96.9	9767.	13.5	0.03	0.24	0.5
SINK 1.60	8.1	3.1	3512.	62.6	0.05	0.10	100.0	100.0	9259.	17.5	0.03	0.23	0.5
MINUS 100	6.6	5.1	7029.	33.7	0.01	0.19	100.0	100.0	9122.	18.5	0.03	0.23	0.5
14 M X 0													
FLOAT 1.30	28.0	34.7	11530.	2.6	0.01	0.18	28.0	34.7	11530.	2.6	0.01	0.18	0.3
1.30- 1.40	51.3	52.1	9435.	14.7	0.01	0.19	79.3	86.9	10174.	10.4	0.01	0.19	0.4
1.40- 1.60	12.4	9.7	7307.	29.7	0.01	0.15	91.7	96.6	9787.	13.0	0.01	0.18	0.4
SINK 1.60	8.4	3.4	3768.	58.5	0.04	0.12	100.0	100.0	9285.	16.8	0.01	0.18	0.4
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	34.1	42.2	11160.	2.1	0.01	0.18	34.1	42.2	11160.	2.1	0.01	0.18	0.3
1.40- 1.60	44.8	45.2	9091.	13.6	0.02	0.24	79.0	87.4	9985.	8.7	0.02	0.21	0.4
SINK 1.60	21.0	12.6	5385.	46.4	0.03	0.18	100.0	100.0	9017.	16.6	0.02	0.21	0.5
SAMPLE MESH SIZE													
PLUS 65	9.4	10.7	10399.	10.1	0.02	0.20	9.4	10.7	10399.	10.1	0.02	0.20	0.4
65 - 100	9.9	11.0	10173.	10.6	0.02	0.23	19.3	21.7	10283.	10.4	0.02	0.22	0.4
100 - 200	27.5	29.8	9903.	12.1	0.02	0.22	46.8	15.5	10060.	11.4	0.02	0.22	0.4
200 - 325	14.4	14.8	9422.	13.0	0.02	0.22	61.1	66.3	9910.	11.8	0.02	0.22	0.4
MINUS 325	38.9	33.7	7910.	26.1	0.02	0.21	100.0	100.0	9133.	17.3	0.02	0.22	0.5

TABLE XX
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 112

STATE: ALASKA
COUNTY: MCGRATH-HOLY CROSS
TOWN: KANTISHNA

MINE: LITTLE TONZONA
COALBED: LITTLE TONZONA
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	3.6	4.3	11681.	5.3	0.03	1.33	3.6	4.3	11681.	5.3	0.03	1.33	2.3
1.30- 1.40	79.8	84.2	10487.	9.0	0.06	1.40	83.4	88.5	10539.	8.9	0.06	1.40	2.7
1.40- 1.60	12.3	10.2	8251.	26.4	0.05	1.24	95.7	98.7	10245.	11.1	0.06	1.38	2.7
SINK 1.60	4.3	1.3	2908.	68.0	0.06	0.67	100.0	100.0	9931.	13.5	0.06	1.35	2.7
MINUS 100	1.0	0.5	5108.	52.3	0.08	1.07	100.0	100.0	9885.	13.9	0.06	1.34	2.7
3/8 X 0													
FLOAT 1.30	5.3	6.4	11618.	4.6	0.02	1.46	5.3	6.4	11618.	4.6	0.02	1.46	2.5
1.30- 1.40	74.5	78.8	10266.	9.3	0.06	1.64	79.9	85.2	10356.	9.0	0.06	1.63	3.1
1.40- 1.60	15.4	13.5	8520.	22.1	0.06	1.41	95.3	98.7	10059.	11.1	0.06	1.59	3.2
SINK 1.60	4.7	1.3	2688.	68.9	0.11	0.62	100.0	100.0	9712.	13.8	0.06	1.55	3.2
MINUS 100	4.1	2.6	6071.	44.4	0.08	0.97	100.0	100.0	9569.	15.0	0.06	1.52	3.2
14 M X 0													
FLOAT 1.30	0.4	0.5	10755.	8.7	0.02	1.34	0.4	0.5	10755.	8.7	0.02	1.34	2.5
1.30- 1.40	74.5	80.1	10429.	9.9	0.05	1.41	74.9	80.6	10431.	9.9	0.05	1.41	2.7
1.40- 1.60	18.5	16.9	8862.	19.1	0.06	1.38	93.4	97.5	10120.	11.7	0.05	1.40	2.8
SINK 1.60	6.6	2.5	3762.	61.3	0.10	1.00	100.0	100.0	9703.	15.0	0.06	1.38	2.8
65 M X 0													
FLOAT 1.30	0.2	0.2	11144.	4.4	0.04	1.35	0.2	0.2	11144.	4.4	0.04	1.35	2.4
1.30- 1.40	19.4	22.7	11093.	5.0	0.04	1.57	19.6	22.9	11093.	5.0	0.04	1.57	2.8
1.40- 1.60	64.2	65.6	9703.	11.2	0.04	1.39	83.8	88.5	10028.	9.7	0.04	1.43	2.9
SINK 1.60	16.2	11.5	6730.	37.9	0.23	1.34	100.0	100.0	9493.	14.3	0.07	1.42	3.0
SAMPLE MESH SIZE													
PLUS 65	8.3	8.6	9980.	10.7	0.09	1.47	8.3	8.6	9980.	10.7	0.09	1.47	2.9
65 - 100	16.1	16.7	10002.	10.7	0.09	1.57	24.4	25.3	9995.	10.7	0.09	1.54	3.1
100 - 200	33.1	34.4	10011.	11.1	0.06	1.38	57.4	59.7	10004.	10.9	0.07	1.45	2.9
200 - 325	14.3	14.6	9800.	12.2	0.09	1.34	71.8	74.3	9963.	11.2	0.08	1.42	2.9
MINUS 325	28.2	25.7	8748.	20.9	0.09	1.23	100.0	100.0	9620.	13.9	0.08	1.38	2.9

TABLE XXI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 113

STATE: ALASKA
COUNTY: KENAI-COOK INLET
TOWN: TYONEK

MINE: BELUGA COAL
COALBED: WATERFALL
COMPANY: BELUGA COAL CO

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	41.2	44.2	11652.	4.9	0.01	0.15	41.2	44.2	11652.	4.9	0.01	0.15	0.3
1.30- 1.40	51.4	51.5	10877.	9.0	0.01	0.24	92.7	95.6	11222.	7.2	0.01	0.20	0.4
1.40- 1.60	5.3	3.4	7029.	32.4	0.01	0.24	98.0	99 1	10995.	8.5	0.01	0.20	0.4
SINK 1.60	2.0	0.9	5031.	53.2	0.04	0.20	100.0	100.0	10874.	9.4	0.01	0.20	0.4
MINUS 100	0.8	0.7	8937.	24.4	0.02	0.22	100.0	100.0	10859.	9.6	0.01	0.20	0.4
3/8 X 0													
FLOAT 1.30	49.7	52.9	11860.	4.8	0.01	0.15	49.7	52.9	11860.	4.8	0.01	0.15	0.3
1.30- 1.40	42.4	41.8	10972.	10.4	0.01	0.16	92.1	94.7	11451.	7.4	0.01	0.15	0.3
1.40- 1.60	5.6	4.3	8488.	19.8	0.01	0.19	97.8	99.0	11281.	8.1	0.01	0.16	0.3
SINK 1.60	2.2	1.0	4969.	54.4	0.02	0.18	100.0	100.0	11139.	9.1	0.01	0.16	0.3
MINUS 100	4.7	4.2	9844.	18.1	0.02	0.11	100.0	100.0	11081.	9.6	0.01	0.16	0.3
14 M X 0													
FLOAT 1.30	17.8	19.1	11776.	5.2	0.01	0.19	17.8	19.1	11776.	5.2	0.01	0.19	0.3
1.30- 1.40	70.7	72.5	11262.	7.8	0.01	0.17	88.5	91.6	11365.	7.3	0.01	0.17	0.3
1.40- 1.60	9.2	7.4	8803.	24.7	0.01	0.17	97.7	99.0	11123.	8.9	0.01	0.17	0.3
SINK 1.60	2.3	1.0	4573.	55.1	0.02	0.17	100.0	100.0	10973.	10.0	0.01	0.17	0.3
65 M X 0													
FLOAT 1.30	1.5	1.7	11436.	4.9	0.01	0.22	1.5	1.7	11436.	4.9	0.01	0.22	0.4
1.30- 1.40	57.7	62.4	11535.	4.3	0.01	0.21	59.2	64.0	11532.	4.3	0.01	0.21	0.4
1.40- 1.60	32.6	31.0	10138.	10.3	0.01	0.33	91.8	95.0	11038.	6.5	0.01	0.25	0.5
SINK 1.60	8.2	5.0	6480.	42.2	0.04	0.46	100.0	100.0	10663.	9.4	0.01	0.27	0.5
200 M X 0													
FLOAT 1.30	0.5	0.5	11495.	6.2	0.01	0.16	0.5	0.5	11495.	6.2	0.01	0.16	0.3
1.30- 1.40	46.2	50.1	11505.	4.4	0.01	0.18	46.6	50.7	11505.	4.4	0.01	0.18	0.3
1.40- 1.60	46.8	45.6	10326.	9.4	0.01	0.24	93.4	96.3	10914.	6.9	0.01	0.21	0.4
SINK 1.60	6.6	3.7	5981.	48.2	0.03	0.40	100.0	100.0	10591.	9.6	0.01	0.22	0.4
325 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	70.4	74.7	11387.	5.0	0.01	0.24	70.4	74.7	11387.	5.0	0.01	0.24	0.4
1.40- 1.60	23.5	22.0	10053.	12.0	0.01	0.20	93.9	96.7	11054.	6.7	0.01	0.23	0.4
SINK 1.60	6.1	3.3	5776.	48.1	0.03	0.40	100.0	100.0	10732.	9.3	0.01	0.24	0.4
SAMPLE MESH SIZE													
PLUS 65	2.2	2.3	11000.	6.9	0.01	0.23	2.2	2.3	11000.	6.9	0.01	0.23	0.4
65 - 200	50.1	51.6	11111.	7.4	0.01	0.24	52.3	53.9	11106.	7.4	0.01	0.24	0.4
200 - 325	23.0	23.2	10851.	10.0	0.01	0.28	75.3	77.1	11028.	8.2	0.01	0.25	0.5
MINUS 325	24.7	22.9	10000.	16.0	0.01	0.23	100.0	100.0	10774.	10.1	0.01	0.25	0.5

TABLE XXII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 114

STATE: ALASKA
COUNTY: PRUDOE BAY-KAKTOVIK
TOWN: SAGWON

MINE: SAGWON
COALBED: SAGWON
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	0.2	0.5	14088.	6.5	0.01	0.14	0.2	0.5	14088.	6.5	0.01	0.14	0.2
1.30- 1.40	14.6	36.9	11305.	9.7	0.01	0.16	14.7	37.5	11337.	9.7	0.01	0.16	0.3
1.40- 1.60	11.8	22.1	8393.	29.0	0.01	0.16	26.5	59.6	10031.	18.2	0.01	0.16	0.3
SINK 1.60	73.5	40.4	2449.	74.3	0.03	0.07	100.0	100.0	4458.	59.4	0.02	0.09	0.4
MINUS 100	2.5	1.5	2716.	70.0	0.05	0.09	100.0	100.0	4416.	59.7	0.03	0.09	0.4
3/8 X 0													
FLOAT 1.30	0.1	0.4	14170.	6.6	0.01	0.12	0.1	0.4	14170.	6.6	0.01	0.12	0.2
1.30- 1.40	13.3	35.8	11182.	8.9	0.01	0.12	13.4	36.2	11209.	8.9	0.01	0.12	0.2
1.40- 1.60	9.4	19.4	8605.	26.4	0.01	0.11	22.8	55.6	10139.	16.1	0.01	0.12	0.2
SINK 1.60	77.3	44.4	2384.	74.7	0.02	0.06	100.0	100.0	4148.	61.3	0.02	0.07	0.4
MINUS 100	4.3	2.8	2627.	68.5	0.03	0.09	100.0	100.0	4085.	61.6	0.02	0.07	0.4
14 M X 0													
FLOAT 1.30	0.1	0.3	11273.	7.5	0.02	0.25	0.1	0.3	11273.	7.5	0.02	0.25	0.4
1.30- 1.40	11.7	30.6	11094.	10.9	0.02	0.16	11.8	30.9	11096.	10.9	0.02	0.16	0.3
1.40- 1.60	10.3	23.2	9599.	18.3	0.02	0.14	22.1	54.0	10400.	14.3	0.02	0.15	0.3
SINK 1.60	77.9	46.0	2513.	73.3	0.03	0.06	100.0	100.0	4257.	60.3	0.03	0.08	0.4
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	12.4	32.8	11514.	4.0	0.02	0.26	12.4	32.8	11514.	4.0	0.02	0.26	0.5
1.40- 1.60	10.5	23.6	9798.	15.8	0.02	0.22	22.9	56.4	10728.	9.4	0.02	0.24	0.5
SINK 1.60	77.1	43.6	2462.	73.9	0.06	0.10	100.0	100.0	4352.	59.2	0.05	0.13	0.6
SAMPLE MESH SIZE													
PLUS 65	1.9	3.7	8474.	21.5	0.04	0.14	1.9	3.7	8474.	21.5	0.04	0.14	0.3
65 - 100	4.9	9.4	8411.	17.6	0.04	0.18	6.8	13.1	8429.	18.7	0.04	0.17	0.4
100 - 200	15.9	30.2	8362.	21.9	0.04	0.16	22.7	43.3	8382.	21.0	0.04	0.16	0.4
200 - 325	9.5	17.9	8280.	28.0	0.04	0.17	32.2	61.2	8352.	23.0	0.04	0.16	0.4
MINUS 325	67.8	38.8	2514.	74.4	0.03	0.09	100.0	100.0	4394.	57.9	0.04	0.13	0.4

XXIII

WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 115

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: PETERS CREEK

MINE: LOCALITY 2
COALBED: LOWER
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	97.7	98.3	11531.	4.5	0.01	0.15	97.7	98.3	11531.	4.5	0.01	0.15	0.3
1.30- 1.40	1.3	1.1	9587.	9.8	0.01	0.04	99.0	99.4	11505.	4.6	0.01	0.15	0.3
1.40- 1.60	0.5	0.4	9218.	22.0	0.01	0.14	99.5	99.8	11494.	4.7	0.01	0.15	0.3
SINK 1.60	0.5	0.2	3846.	65.1	0.04	0.07	100.0	100.0	11452.	5.0	0.01	0.15	0.3
MINUS 100	0.8	0.7	9268.	21.3	0.03	0.13	100.0	100.0	11435.	5.2	0.01	0.15	0.3
3/8 X 0													
FLOAT 1.30	95.8	96.2	11587.	4.2	0.01	0.14	95.8	96.2	11587.	4.2	0.01	0.14	0.2
1.30- 1.40	3.8	3.6	10854.	8.6	0.01	0.13	99.6	99.8	11559.	4.3	0.01	0.14	0.2
1.40- 1.60	0.2	0.2	8694.	28.4	0.05	0.19	99.8	100.0	11553.	4.4	0.01	0.14	0.2
SINK 1.60	0.2	0.0	1630.	80.9	0.05	0.08	100.0	100.0	11535.	4.5	0.01	0.14	0.2
MINUS 100	3.2	3.1	11108.	8.6	0.03	0.10	100.0	100.0	11522.	4.7	0.01	0.14	0.2
14 M X 0													
FLOAT 1.30	97.9	98.5	11384.	4.2	0.01	0.16	97.9	98.5	11384.	4.2	0.01	0.16	0.3
1.30- 1.40	1.0	0.9	10430.	7.8	0.02	0.15	98.9	99.4	11374.	4.2	0.01	0.16	0.3
1.40- 1.60	0.6	0.5	9275.	16.0	0.05	0.18	99.5	99.9	11361.	4.3	0.01	0.16	0.3
SINK 1.60	0.5	0.1	2522.	36.4	0.07	0.08	100.0	100.0	11318.	4.4	0.01	0.16	0.3
65 M X 0													
FLOAT 1.30	0.8	0.8	11462.	2.3	0.01	0.18	0.8	0.8	11462.	2.3	0.01	0.18	0.3
1.30- 1.40	58.7	60.0	11568.	3.5	0.01	0.19	59.6	60.8	11567.	3.5	0.01	0.19	0.3
1.40- 1.60	25.5	24.6	10940.	5.1	0.01	0.19	85.1	85.5	11379.	4.0	0.01	0.19	0.3
SINK 1.60	14.9	14.5	11017.	5.8	0.02	0.18	100.0	100.0	11325.	4.2	0.01	0.19	0.3
SAMPLE MESH SIZE													
PLUS 65	9.5	9.6	11353.	3.5	0.01	0.16	9.5	9.6	11353.	3.5	0.01	0.16	0.3
65 - 100	13.8	13.8	11280.	3.8	0.01	0.15	23.4	23.3	11310.	3.7	0.01	0.15	0.3
100 - 200	31.3	31.5	11372.	4.0	0.01	0.16	54.7	54.8	11345.	3.8	0.01	0.16	0.3
200 - 325	15.1	15.2	11322.	4.1	0.01	0.18	69.8	70.0	11340.	3.9	0.01	0.16	0.3
MINUS 325	30.2	30.0	11266.	5.7	0.01	0.17	100.0	100.0	11318.	4.4	0.01	0.16	0.3

TABLE XXIV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 116

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: PETERS CREEK

MINE: LOCALITY 2
COALBED: UPPER
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	99.1	99.3	11401.	3.6	0.01	0.10	99.1	99.3	11401.	3.6	0.01	0.10	0.2
1.30- 1.40	0.6	0.5	10160.	11.4	0.01	0.13	99.7	99.9	11394.	3.6	0.01	0.10	0.2
1.40- 1.60	0.2	0.1	7213.	33.5	0.11	0.11	99.9	100.0	11385.	3.7	0.01	0.10	0.2
SINK 1.60	0.1	0.0	2116.	77.5	0.10	0.13	100.0	100.0	11374.	3.8	0.01	0.10	0.2
MINUS 100	0.8	0.7	10662.	12.4	0.05	0.09	100.0	100.0	11369.	3.8	0.01	0.10	0.2
3/8 X 0													
FLOAT 1.30	97.0	97.5	11393.	3.5	0.01	0.13	97.0	97.5	11393.	3.5	0.01	0.13	0.2
1.30- 1.40	2.9	2.4	9627.	7.6	0.01	0.19	99.9	99.9	11342.	3.6	0.01	0.13	0.2
1.40- 1.60	0.1	0.1	9293.	21.2	0.04	0.24	100.0	100.0	11340.	3.6	0.01	0.13	0.2
SINK 1.60	0.0	0.0	4199.	63.0	0.08	0.14	100.0	100.0	11337.	3.7	0.01	0.13	0.2
MINUS 100	3.0	2.8	10470.	4.2	0.01	0.11	100.0	100.0	11312.	3.7	0.01	0.13	0.2
14 M X 0													
FLOAT 1.30	99.2	99.4	11499.	3.3	0.01	0.10	99.2	99.4	11499.	3.3	0.01	0.10	0.2
1.30- 1.40	0.4	0.4	10819.	6.2	0.02	0.14	99.6	99.7	11496.	3.3	0.01	0.10	0.2
1.40- 1.60	0.2	0.2	9352.	14.2	0.09	0.20	99.8	99.9	11491.	3.3	0.01	0.10	0.2
SINK 1.60	0.2	0.1	3511.	69.7	0.14	0.10	100.0	100.0	11477.	3.4	0.01	0.10	0.2
65 M X 0													
FLOAT 1.30	0.4	0.4	11639.	1.4	0.01	0.19	0.4	0.4	11639.	1.4	0.01	0.19	0.3
1.30- 1.40	63.7	64.9	11529.	2.8	0.01	0.17	64.1	65.3	11530.	2.8	0.01	0.17	0.3
1.40- 1.60	21.0	20.0	10833.	4.3	0.01	0.17	85.1	85.3	11358.	3.1	0.01	0.17	0.3
SINK 1.60	14.9	14.7	11117.	4.4	0.01	0.17	100.0	100.0	11322.	3.3	0.01	0.17	0.3
SAMPLE MESH SIZE													
PLUS 65	20.1	20.3	11430.	3.0	0.01	0.13	20.1	20.3	11430.	3.0	0.01	0.13	2.3
65 - 100	11.6	11.7	11414.	3.2	0.01	0.13	31.7	32.0	11424.	3.1	0.01	0.13	0.5
100 - 200	26.0	26.1	11371.	3.3	0.01	0.12	57.7	58.1	11400.	3.2	0.01	0.13	0.3
200 - 325	11.9	11.9	11304.	3.8	0.01	0.12	69.6	70.0	11384.	3.3	0.01	0.12	0.3
MINUS 325	30.4	30.0	11204.	4.9	0.01	0.13	100.0	100.0	11329.	3.8	0.01	0.13	0.3

TABLE XXV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 117

STATE: ALASKA
COUNTY: BARROW-POINT HOPE
TOWN: TRAMWAY BAR

MINE: TRAMWAY BAR
COALBED: 17 FT BED
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	0.0	0.1	12093.	4.6	0.02	0.20	0.0	0.1	12093.	4.6	0.02	0.20	0.3
1.30- 1.40	22.1	37.2	12183.	6.3	0.02	0.29	22.2	37.3	12183.	6.2	0.02	0.29	0.5
1.40- 1.60	24.6	37.2	10930.	16.2	0.02	0.26	46.8	74.4	11523.	11.5	0.02	0.27	0.5
SINK 1.60	53.2	25.6	3483.	66.3	0.07	0.08	100.0	100.0	7244.	40.7	0.05	0.17	0.5
MINUS 100	0.9	0.6	4963.	56.8	0.06	0.10	100.0	100.0	7225.	40.8	0.05	0.17	0.5
3/8 X 0													
FLOAT 1.30	0.1	0.1	11995.	3.6	0.01	0.26	0.1	0.1	11995.	3.6	0.01	0.26	0.4
1.30- 1.40	23.9	39.5	12610.	5.7	0.01	0.29	24.0	39.6	12608.	5.6	0.01	0.29	0.5
1.40- 1.60	23.4	34.9	11393.	13.8	0.01	0.12	47.4	74.6	12008.	9.7	0.01	0.21	0.3
SINK 1.60	52.6	25.4	3693.	65.6	0.02	0.08	100.0	100.0	7637.	39.0	0.02	0.14	0.4
MINUS 100	2.5	1.7	5197.	55.4	0.04	0.09	100.0	100.0	7577.	39.5	0.02	0.14	0.4
14 M X 0													
FLOAT 1.30	0.1	0.2	12050.	3.8	0.02	0.20	0.1	0.2	12050.	3.8	0.02	0.20	0.3
1.30- 1.40	24.2	40.0	12570.	5.3	0.01	0.32	24.3	40.2	12567.	5.3	0.01	0.32	0.5
1.40- 1.60	27.7	39.5	10867.	17.4	0.05	0.21	52.0	79.8	11663.	11.8	0.03	0.26	0.4
SINK 1.60	48.0	20.2	3208.	67.8	0.06	0.06	100.0	100.0	7607.	38.6	0.05	0.16	0.4
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	26.9	44.3	12401.	3.3	0.02	0.37	26.9	44.3	12401.	3.3	0.02	0.37	0.6
1.40- 1.60	21.3	30.7	10855.	14.9	0.02	0.26	48.1	75.0	11718.	8.4	0.02	0.32	0.5
SINK 1.60	51.9	25.0	3623.	69.6	0.08	0.12	100.0	100.0	7517.	40.2	0.05	0.22	0.6
SAMPLE MESH SIZE													
PLUS 65	2.9	3.3	8574.	23.9	0.05	0.25	2.9	3.3	8574.	23.9	0.05	0.25	0.6
65 - 100	2.9	3.5	9241.	25.7	0.05	0.28	5.8	6.8	8909.	24.8	0.05	0.27	0.6
100 - 200	17.2	21.3	9398.	24.6	0.04	0.25	23.1	28.1	9275.	24.6	0.04	0.25	0.5
200 - 325	16.9	20.2	9097.	26.3	0.05	0.27	40.0	48.3	9199.	25.3	0.05	0.26	0.6
MINUS 325	60.0	51.7	6554.	46.0	0.02	0.19	100.0	100.0	7612.	37.7	0.04	0.23	0.6

TABLE XXVI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 118

STATE: ALASKA
COUNTY: KENAI-COOK INLET
TOWN: HOMER

MINE: HOMER COAL CORP
COALBED: CABIN
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	35.0	38.5	11578.	4.5	0.03	0.48	35.0	38.5	11578.	4.5	0.03	0.48	0.8
1.30- 1.40	54.3	54.4	10531.	11.1	0.01	0.40	89.3	93.0	10941.	8.5	0.02	0.43	0.8
1.40- 1.60	8.6	6.4	7855.	32.5	0.02	0.35	97.9	99.4	10671.	10.6	0.02	0.42	0.8
SINK 1.60	2.1	0.6	3116.	68.1	0.13	0.10	100.0	100.0	10513.	11.8	0.02	0.42	0.8
MINUS 100	0.6	0.5	8855.	26.6	0.02	0.42	100.0	100.0	10502.	11.9	0.02	0.42	0.8
3/8 X 0													
FLOAT 1.30	39.0	41.9	11644.	5.0	0.01	0.51	39.0	41.9	11644.	5.0	0.01	0.51	0.9
1.30- 1.40	51.7	51.7	10845.	10.8	0.01	0.47	90.8	93.6	11189.	8.3	0.01	0.49	0.9
1.40- 1.60	5.2	4.3	9041.	25.9	0.11	0.42	96.0	97.9	11073.	9.3	0.02	0.48	0.9
SINK 1.60	4.1	2.1	5594.	50.8	0.05	0.31	100.0	100.0	10851.	10.9	0.02	0.48	0.9
MINUS 100	3.5	3.4	10303.	15.8	0.01	0.43	100.0	100.0	10832.	11.1	0.02	0.47	0.9
14 M X 0													
FLOAT 1.30	21.0	23.0	11880.	4.0	0.02	0.50	21.0	23.0	11880.	4.0	0.02	0.50	0.8
1.30- 1.40	56.7	59.0	11279.	7.3	0.01	0.45	77.7	82.0	11441.	6.4	0.01	0.46	0.8
1.40- 1.60	16.8	14.9	9604.	21.0	0.01	0.39	94.5	96.9	11115.	9.0	0.01	0.45	0.8
SINK 1.60	5.5	3.1	6030.	44.6	0.06	0.34	100.0	100.0	10835.	11.0	0.01	0.44	0.8
65 M X 0													
FLOAT 1.30	0.3	0.4	11536.	4.6	0.02	0.39	0.3	0.4	11536.	4.6	0.02	0.39	0.7
1.30- 1.40	36.0	40.7	11490.	4.9	0.02	0.49	36.3	41.1	11490.	4.9	0.02	0.49	0.9
1.40- 1.60	49.3	48.9	10083.	13.6	0.02	0.50	85.6	90.0	10680.	9.9	0.02	0.50	0.9
SINK 1.60	14.4	10.0	7031.	40.1	0.02	0.39	100.0	100.0	10153.	14.2	0.02	0.48	0.9
SAMPLE MESH SIZE													
PLUS 65	11.0	11.4	10576.	11.8	0.02	0.33	11.0	11.4	10576.	11.8	0.02	0.33	0.6
65 - 100	11.9	12.5	10678.	11.0	0.02	0.32	23.0	23.9	10629.	11.4	0.02	0.32	0.6
100 - 200	30.4	31.6	10597.	11.5	0.02	0.34	53.3	55.5	10611.	11.4	0.02	0.33	0.6
200 - 325	16.3	16.8	10533.	12.2	0.02	0.31	69.6	72.3	10593.	11.6	0.02	0.33	0.6
MINUS 325	30.4	27.7	9292.	21.8	0.02	0.27	100.0	100.0	10197.	14.7	0.02	0.31	0.6

TABLE XXVII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 119

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: HEALY

MINE: USIBELLI
COALBED: NO. FOUR
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	37.7						37.7						
3/8 X 14 MESH	49.1						86.8						
14 M X 100 M	12.4						99.2						
MINUS 100 M	0.8						100.0						
1 1/2 X 0													
FLOAT 1.30	35.5	37.3	11441.	5.5	0.03	0.21	35.5	37.3	11441.	5.5	0.03	0.21	0.4
1.30- 1.40	61.3	59.8	10644.	10.9	0.01	0.30	96.8	97.1	10936.	8.9	0.02	0.27	0.5
1.40- 1.60	3.0	2.7	9978.	22.2	0.02	0.86	99.8	99.8	10908.	9.3	0.02	0.28	0.5
SINK 1.60	0.2	0.2	7771.	33.5	0.13	0.51	100.0	100.0	10901.	9.4	0.02	0.29	0.5
MINUS 100	0.8	0.7	10102.	15.8	0.03	0.57	100.0	100.0	10895.	9.4	0.02	0.29	0.5
3/8 X 0													
FLOAT 1.30	34.4	35.9	11245.	5.4	0.01	0.17	34.4	35.9	11245.	5.4	0.01	0.17	0.3
1.30- 1.40	61.1	60.0	10575.	10.5	0.01	0.34	95.5	95.9	10816.	8.7	0.01	0.28	0.5
1.40- 1.60	4.1	3.7	9739.	19.7	0.11	0.50	99.6	99.6	10772.	9.1	0.01	0.29	0.5
SINK 1.60	0.4	0.4	9335.	21.1	0.05	0.38	100.0	100.0	10766.	9.2	0.01	0.29	0.5
MINUS 100	3.1	3.1	10801.	8.3	0.03	0.23	100.0	100.0	10767.	9.1	0.01	0.29	0.5
14 M X 0													
FLOAT 1.30	1.0	1.1	11502.	4.7	0.02	0.20	1.0	1.1	11502.	4.7	0.02	0.20	0.3
1.30- 1.40	69.3	70.4	10886.	8.2	0.01	0.26	70.4	71.5	10895.	8.2	0.01	0.26	0.5
1.40- 1.60	28.8	28.1	10456.	11.3	0.01	0.54	99.2	99.6	10768.	9.1	0.01	0.34	0.6
SINK 1.60	0.9	0.4	4766.	55.6	0.06	0.18	100.0	100.0	10717.	9.5	0.01	0.34	0.6
65 M X 0													
FLOAT 1.30	0.1	1.4	114466. 3.9	0.02	0.53	0.1	1.4	114466.	3.9	0.02	0.53	0.1	
1.30- 1.40	31.4	33.4	11310.	5.0	0.02	0.22	31.5	34.8	11735.	5.0	0.02	0.22	0.4
1.40- 1.60	56.9	55.4	10362.	8.5	0.02	0.24	88.4	90.2	10852.	7.3	0.02	0.23	0.4
SINK 1.60	11.6	9.8	8957.	20.8	0.02	0.23	100.0	100.0	10632.	8.8	0.02	0.23	0.4
SAMPLE MESH SIZE													
PLUS 65	7.9	8.0	10788.	7.6	0.02	0.17	7.9	8.0	10788.	7.6	0.02	0.17	0.3
65 - 100	10.5	10.6	10750.	7.4	0.02	0.16	18.3	18.7	10766.	7.5	0.02	0.16	0.3
100 - 200	33.5	34.0	10763.	7.4	0.02	0.17	51.8	52.7	10764.	7.4	0.02	0.17	0.3
200 - 325	16.0	16.2	10740.	7.7	0.02	0.19	67.8	68.9	10758.	7.5	0.02	0.17	0.3
MINUS 325	32.2	31.1	10211.	11.8	0.02	0.20	100.0	100.0	10582.	8.9	0.02	0.18	0.3

TABLE XXVIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 120

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: USIBELLI

MINE: USIBELLI
COALBED: MARGUERITE CREEK
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	54.6						54.6						
3/8 X 14 MESH	43.5						98.1						
14 M X 100 M	1.2						99.3						
MINUS 100 M	0.7						100.0						
1 1/2 X 0													
FLOAT 1.30	59.7	64.9	10833.	7.1	0.04	0.11	59.7	64.9	10833.	7.1	0.04	0.11	0.2
1.30- 1.40	23.2	22.8	9769.	11.5	0.04	0.14	82.9	87.7	10535.	8.3	0.04	0.12	0.2
1.40- 1.60	14.0	11.3	8017.	26.0	0.03	0.17	96.9	99.0	10171.	10.8	0.04	0.13	0.2
SINK 1.60	3.1	1.0	3143.	67.8	0.01	0.12	100.0	100.0	9955.	12.6	0.04	0.13	0.3
MINUS 100	0.7	0.5	7563.	31.6	0.03	0.20	100.0	100.0	9939.	12.7	0.04	0.13	0.3
3/8 X 0													
FLOAT 1.30	52.1	57.9	11051.	6.6	0.04	0.10	52.1	57.9	11051.	6.6	0.04	0.10	0.2
1.30- 1.40	31.7	31.6	9901.	10.5	0.04	0.16	83.8	89.5	10616.	8.0	0.04	0.12	0.2
1.40- 1.60	10.6	8.5	7924.	27.5	0.03	0.16	94.5	97.9	10313.	10.2	0.04	0.13	0.2
SINK 1.60	5.5	2.1	3736.	62.0	0.02	0.13	100.0	100.0	9950.	13.1	0.04	0.13	0.3
MINUS 100	4.4	3.5	7801.	29.2	0.03	0.13	100.0	100.0	9859.	13.8	0.04	0.13	0.3
14 M X 0													
FLOAT 1.30	40.6	44.6	11032.	6.6	0.03	0.10	40.6	44.6	11032.	6.6	0.03	0.10	0.2
1.30- 1.40	38.9	39.9	10312.	8.9	0.03	0.13	79.5	84.4	10680.	7.7	0.03	0.11	0.2
1.40- 1.60	16.2	13.9	8630.	21.7	0.03	0.18	95.7	98.3	10333.	10.1	0.03	0.13	0.2
SINK 1.60	4.3	1.7	3890.	61.7	0.03	0.12	100.0	100.0	10053.	12.3	0.03	0.13	0.2
65 M X 0													
FLOAT 1.30	0.2	0.2	11532.	3.9	0.01	0.18	0.2	0.2	11532.	3.9	0.01	0.18	0.3
1.30- 1.40	19.3	21.9	11405.	4.9	0.01	0.50	19.5	22.1	11406.	4.9	0.01	0.50	0.9
1.40- 1.60	62.7	64.1	10234.	8.3	0.01	0.50	82.1	86.2	10512.	7.5	0.01	0.50	1.0
SINK 1.60	17.9	13.8	7756.	35.9	0.02	0.16	100.0	100.0	10029.	12.5	0.01	0.44	0.9
SAMPLE MESH SIZE													
PLUS 65	6.4	6.9	10715.	7.8	0.01	0.13	6.4	6.9	10715.	7.8	0.01	0.13	0.2
65 - 100	10.5	11.4	10667.	7.9	0.01	0.13	16.9	18.3	10685.	7.8	0.01	0.13	0.2
100 - 200	32.1	34.7	10619.	8.1	0.01	0.12	49.0	53.0	10642.	8.0	0.01	0.12	0.2
200 - 325	13.6	14.6	10547.	8.6	0.01	0.12	62.6	67.6	10621.	8.1	0.01	0.12	0.2
MINUS 325	37.4	32.4	8533.	23.4	0.01	0.12	100.0	100.0	9841.	13.8	0.01	0.12	0.2

TABLE XXIX
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 121

STATE: ALASKA
COUNTY: YUKON FLATS
TOWN: COAL CREEK

MINE: COAL CREEK
COALBED: COAL CREEK
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	0.0	0.1	11141.	7.8	0.03	0.27	0.0	0.1	11141.	7.8	0.03	0.27	0.5
1.30- 1.40	21.9	26.5	8949.	9.6	0.03	0.55	22.0	26.5	8953.	9.6	0.03	0.55	1.2
1.40- 1.60	60.7	68.8	8392.	15.2	0.06	0.58	82.7	95.3	8541.	13.7	0.05	0.57	1.3
SINK 1.60	17.3	4.7	1989.	71.6	0.04	0.17	100.0	100.0	7406.	23.7	0.05	0.50	1.4
MINUS 100	0.9	0.8	6445.	30.0	0.03	0.34	100.0	100.0	7398.	23.8	0.05	0.50	1.4
3/8 X 0													
FLOAT 1.30	0.0	0.0	11025.	3.8	0.03	0.24	0.0	0.0	11025.	3.8	0.03	0.24	0.4
1.30- 1.40	23.0	28.4	9454.	10.3	0.04	0.64	23.0	28.4	9456.	10.3	0.04	0.64	1.4
1.40- 1.60	60.0	66.5	8483.	16.0	0.06	0.62	83.1	94.9	8753.	14.4	0.05	0.63	1.4
SINK 1.60	16.9	5.1	2321.	69.5	0.04	0.20	100.0	100.0	7664.	23.8	0.05	0.55	1.4
MINUS 100	2.0	1.7	6415.	32.5	0.03	0.39	100.0	100.0	7639.	23.9	0.05	0.55	1.4
14 M X 0													
FLOAT 1.30	0.2	0.2	11002.	2.9	0.03	0.29	0.2	0.2	11002.	2.9	0.03	0.29	0.5
1.30- 1.40	10.0	12.5	9642.	10.6	0.03	0.61	10.1	12.7	9663.	10.4	0.03	0.60	1.3
1.40- 1.60	73.9	83.0	8675.	13.9	0.06	0.60	84.0	95.7	8794.	13.4	0.06	0.60	1.4
SINK 1.60	16.0	4.3	2086.	71.6	0.06	0.17	100.0	100.0	7722.	22.7	0.06	0.53	1.4
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	0.6	0.8	9575.	6.6	0.03	0.64	0.6	0.8	9575.	6.6	0.03	0.64	1.3
1.40- 1.60	58.9	75.6	9118.	10.6	0.03	0.71	59.5	76.4	9123.	10.5	0.03	0.71	1.6
SINK 1.60	40.5	23.6	4129.	46.9	0.04	0.44	100.0	100.0	7100.	25.2	0.03	0.60	1.7
SAMPLE MESH SIZE													
PLUS 65	2.0	2.4	8771.	16.1	0.04	0.53	2.0	2.4	8771.	16.1	0.04	0.53	1.2
65 - 100	5.5	6.5	8726.	15.6	0.03	0.49	7.6	8.9	8738.	15.7	0.03	0.50	1.1
100 - 200	23.9	27.3	8460.	16.9	0.04	0.58	31.4	36.2	8527.	16.6	0.04	0.56	1.3
200 - 325	16.2	17.6	8025.	20.3	0.03	0.48	47.7	53.8	8356.	17.9	0.04	0.53	1.3
MINUS 325	52.4	46.2	6523.	33.5	0.03	0.38	100.0	100.0	7396.	26.0	0.03	0.48	1.2

TABLE XXX
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 122

STATE: ALASKA
COUNTY: KENAI-COOK INLET
TOWN: NINILCHIK

MINE: NINILCHIK
COALBED: NINILCHIK
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	60.8						60.8						
3/8 X 14 MESH	33.4						94.2						
14 M X 100 M	4.7						98.9						
MINUS 100 M	1.1						100.0						
1 1/2 X 0													
FLOAT 1.30	13.6	16.5	11192.	5.2	0.04	0.23	13.6	16.5	11192.	5.2	0.04	0.23	0.4
1.30- 1.40	49.7	56.7	10545.	9.0	0.06	0.30	63.3	73.2	10684.	8.2	0.06	0.28	0.5
1.40- 1.60	28.1	23.2	7627.	32.8	0.06	0.34	91.4	96.4	9745.	15.7	0.06	0.30	0.6
SINK 1.60	8.6	3.6	3843.	61.2	0.08	0.14	100.0	100.0	9239.	19.6	0.06	0.29	0.6
MINUS 100	1.0	0.5	4575.	59.0	0.06	0.23	100.0	100.0	9192.	20.0	0.06	0.29	0.6
3/8 X 0													
FLOAT 1.30	18.0	21.8	11332.	5.2	0.03	0.24	18.0	21.8	11332.	5.2	0.03	0.24	0.4
1.30- 1.40	49.6	56.6	10661.	7.7	0.06	0.29	67.6	78.4	10839.	7.1	0.05	0.28	0.5
1.40- 1.60	21.7	17.2	7384.	34.3	0.06	0.36	89.3	95.6	9999.	13.7	0.05	0.30	0.6
SINK 1.60	10.7	4.4	3881.	61.3	0.08	0.19	100.0	100.0	9345.	18.8	0.06	0.29	0.6
MINUS 100	3.6	2.7	7019.	39.0	0.06	0.22	100.0	100.0	9265.	19.5	0.06	0.28	0.6
14 M X 0													
FLOAT 1.30	4.9	6.1	11647.	5.7	0.03	0.24	4.9	6.1	11647.	5.7	0.03	0.24	0.4
1.30- 1.40	63.2	72.6	10796.	6.5	0.05	0.26	68.1	78.7	10858.	6.4	0.05	0.26	0.5
1.40- 1.60	16.9	14.8	8225.	27.5	0.05	0.35	85.0	93.5	10333.	10.6	0.05	0.28	0.5
SINK 1.60	15.0	6.5	4044.	66.1	0.07	0.20	100.0	100.0	9391.	18.9	0.05	0.27	0.6
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	34.4	42.6	11009.	4.6	0.03	0.32	34.4	42.6	11009.	4.6	0.03	0.32	0.6
1.40- 1.60	38.2	42.3	9841.	12.1	0.03	0.36	72.5	85.0	10394.	8.5	0.03	0.34	0.7
SINK 1.60	27.5	15.0	4847.	53.9	0.06	0.26	100.0	100.0	8870.	21.0	0.04	0.32	0.7
SAMPLE MESH SIZE													
PLUS 65	11.6	13.2	10268.	9.8	0.05	0.31	11.6	13.2	10268.	9.8	0.05	0.31	0.6
65 - 100	10.8	12.0	9934.	12.7	0.05	0.31	22.4	25.2	10107.	11.2	0.05	0.31	0.6
100 - 200	30.6	32.6	9589.	15.8	0.06	0.33	53.0	57.9	9808.	13.9	0.06	0.32	0.7
200 - 325	14.0	14.3	9193.	19.3	0.06	0.33	67.0	72.2	9679.	15.0	0.06	0.32	0.7
MINUS 325	33.0	27.8	7568.	32.9	0.04	0.28	100.0	100.0	8983.	20.9	0.05	0.31	0.7

TABLE XXXI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 123

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: BROAD PASS

MINE: DUNKLE
COALBED: DUNKLE BED
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	42.1	49.8	12823.	4.6	0.03	0.45	42.1	49.8	12823.	4.6	0.03	0.45	0.7
1.30- 1.40	34.0	37.3	11921.	9.2	0.03	0.52	76.1	87.1	12420.	6.7	0.03	0.48	0.8
1.40- 1.60	11.8	10.2	9406.	24.0	0.11	0.34	87.9	97.3	12016.	9.0	0.04	0.46	0.8
SINK 1.60	12.1	2.7	2381.	70.8	0.11	0.11	100.0	100.0	10847.	16.5	0.05	0.42	0.8
MINUS 100	1.2	0.6	5286.	56.1	0.03	0.35	100.0	100.0	10780.	17.0	0.05	0.42	0.8
3/8 X 0													
FLOAT 1.30	46.9	54.8	12832.	4.2	0.03	0.53	46.9	54.8	12832.	4.2	0.03	0.53	0.8
1.30- 1.40	31.5	34.0	11874.	9.2	0.03	0.49	78.4	88.8	12447.	6.2	0.03	0.51	0.8
1.40- 1.60	9.6	8.3	9573.	24.5	0.11	0.38	87.9	97.2	12135.	8.2	0.04	0.50	0.8
SINK 1.60	12.1	2.8	2578.	68.9	0.10	0.12	100.0	100.0	10980.	15.5	0.05	0.45	0.8
MINUS 100	6.2	5.3	9421.	27.7	0.03	0.42	100.0	100.0	10890.	16.2	0.05	0.45	0.8
14 M X 0													
FLOAT 1.30	30.7	36.0	12886.	4.1	0.03	0.49	30.7	36.0	12886.	4.1	0.03	0.49	0.8
1.30- 1.40	46.5	52.2	12301.	6.8	0.03	0.44	77.2	88.2	12533.	5.8	0.03	0.46	0.7
1.40- 1.60	9.9	8.8	9746.	23.5	0.11	0.37	87.1	97.0	12218.	7.8	0.04	0.45	0.7
SINK 1.60	12.9	3.0	2563.	67.2	0.08	0.13	100.0	100.0	10968.	15.5	0.04	0.41	0.7
65 M X 0													
FLOAT 1.30	1.4	1.6	12683.	3.0	0.03	0.53	1.4	1.6	12683.	3.0	0.03	0.53	0.8
1.30- 1.40	67.4	78.3	12305.	4.3	0.03	0.45	68.8	79.9	12312.	4.2	0.03	0.45	0.7
1.40- 1.60	13.4	12.9	10217.	17.2	0.04	0.49	82.2	92.8	11970.	6.4	0.03	0.46	0.8
SINK 1.60	17.8	7.2	4288.	57.4	0.04	0.22	100.0	100.0	10606.	15.4	0.03	0.42	0.8
SAMPLE MESH SIZE													
PLUS 65	7.6	8.2	11548.	11.4	0.03	0.52	7.6	8.2	11548.	11.4	0.03	0.52	0.9
65 - 100	11.0	11.8	11519.	11.6	0.03	0.50	18.5	20.0	11531.	11.5	0.03	0.51	0.9
100 - 200	33.7	35.6	11323.	12.2	0.03	0.53	52.2	55.6	11397.	11.9	0.03	0.52	0.9
200 - 325	18.5	19.2	11130.	13.9	0.03	0.57	70.7	74.9	11327.	12.4	0.03	0.53	0.9
MINUS 325	29.4	25.1	9160.	24.9	0.03	0.42	100.0	100.0	10691.	16.1	0.03	0.51	0.9

TABLE XXXII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 124

STATE: ALASKA
COUNTY: YUKON FLATS
TOWN: CHICKEN

MINE: CHICKEN
COALBED: CHICKEN
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	61.0						61.0						
3/8 X 14 MESH	34.5						95.5						
14 M X 100 M	3.2						98.7						
MINUS 100 M	1.3						100.0						
1 1/2 X 0													
FLOAT 1.30	12.6	17.3	10266.	7.0	0.03	1.26	12.6	17.3	10266.	7.0	0.03	1.26	2.5
1.30- 1.40	28.1	34.9	9250.	11.3	0.03	1.39	40.7	52.2	9564.	10.0	0.03	1.35	2.8
1.40- 1.60	35.4	33.8	7103.	27.5	0.04	1.29	76.1	86.1	8418.	18.1	0.03	1.32	3.1
SINK 1.60	23.9	13.9	4337.	66.1	0.06	2.49	100.0	100.0	7442.	29.6	0.04	1.60	4.3
MINUS 100	1.5	0.9	4475.	49.2	0.04	1.29	100.0	100.0	7399.	29.9	0.04	1.60	4.3
3/8 X 0													
FLOAT 1.30	4.9	7.3	10940.	6.4	0.03	1.26	4.9	7.3	10940.	6.4	0.03	1.26	2.3
1.30- 1.40	30.9	39.3	9388.	8.8	0.03	1.28	35.8	46.6	9602.	8.5	0.03	1.28	2.7
1.40- 1.60	37.7	38.0	7452.	24.9	0.03	1.20	73.5	84.6	8500.	16.9	0.03	1.24	2.9
SINK 1.60	26.5	15.4	4286.	66.3	0.06	2.45	100.0	100.0	7384.	30.0	0.04	1.56	4.2
MINUS 100	2.8	1.8	4783.	48.6	0.04	0.84	100.0	100.0	7312.	30.5	0.04	1.54	4.2
14 M X 0													
FLOAT 1.30	3.2	4.1	10520.	5.5	0.03	1.20	3.2	4.1	10520.	5.5	0.03	1.20	2.3
1.30- 1.40	28.6	34.3	9888.	6.7	0.03	1.26	31.8	38.4	9951.	6.6	0.03	1.25	2.5
1.40- 1.60	44.2	38.3	7152.	27.7	0.04	1.24	76.0	76.7	8324.	18.9	0.04	1.25	3.0
SINK 1.60	24.0	23.3	7987.	66.2	0.06	2.50	100.0	100.0	8243.	30.2	0.04	1.55	3.8
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	5.2	8.1	11494.	2.6	0.03	1.21	5.2	8.1	11494.	2.6	0.03	1.21	2.1
1.40- 1.60	48.8	61.5	9280.	10.2	0.04	1.28	54.0	69.6	9494.	9.5	0.04	1.27	2.7
SINK 1.60	46.0	30.4	4856.	49.2	0.08	2.06	100.0	100.0	7359.	27.8	0.06	1.64	4.4
SAMPLE MESH SIZE													
PLUS 65	6.6	7.7	8868.	17.3	0.06	1.11	6.6	7.7	8868.	17.3	0.06	1.11	2.5
65 - 100	11.9	13.7	8609.	18.3	0.06	1.17	18.5	21.4	8701.	18.0	0.06	1.15	2.6
100 - 200	14.2	15.7	8337.	20.1	0.06	1.31	32.7	37.1	8543.	18.9	0.06	1.22	2.9
200 - 325	29.4	30.7	7843.	24.2	0.06	1.12	62.0	67.8	8211.	21.4	0.06	1.17	2.9
MINUS 325	38.0	32.2	6376.	37.6	0.06	0.93	100.0	100.0	7515.	27.5	0.06	1.11	2.9

TABLE XXXIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 125

STATE: ALASKA
COUNTY: BARROW-POINT HOPE
TOWN: POINT LAY

MINE: ELUSIVE CREEK
COALBED: BED 3
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	26.0						26.0						
3/8 X 14 MESH	69.2						95.2						
14 M X 100 M	4.0						99.2						
MINUS 100 M	0.8						100.0						
1 1/2 X 0													
FLOAT 1.30	2.8	2.8	12549.	1.9	0.03	0.25	2.8	2.8	12549.	1.9	0.03	0.25	0.4
1.30- 1.40	89.3	90.4	12535.	1.8	0.03	0.31	92.1	93.2	12535.	1.8	0.03	0.31	0.5
1.40- 1.60	6.6	6.1	11460.	6.7	0.05	0.27	98.7	99.3	12464.	2.1	0.03	0.31	0.5
SINK 1.60	1.3	0.7	6351.	28.9	0.10	0.21	100.0	100.0	12384.	2.4	0.03	0.30	0.5
MINUS 100	0.8	0.6	9489.	20.4	0.03	0.29	100.0	100.0	12362.	2.6	0.03	0.30	0.5
3/8 X 0													
FLOAT 1.30	3.0	3.1	12590.	1.6	0.03	0.26	3.0	3.1	12590.	1.6	0.03	0.26	0.4
1.30- 1.40	82.5	84.0	12545.	1.6	0.03	0.27	85.5	87.1	12547.	1.6	0.03	0.27	0.4
1.40- 1.60	13.0	12.1	11460.	4.8	0.05	0.28	98.4	99.2	12404.	2.0	0.03	0.27	0.4
SINK 1.60	1.6	0.8	6540.	30.3	0.10	0.27	100.0	100.0	12311.	2.5	0.03	0.27	0.4
MINUS 100	6.0	5.4	10989.	10.4	0.03	0.20	100.0	100.0	12237.	2.9	0.03	0.27	0.4
14 M X 0													
FLOAT 1.30	5.8	5.9	12574.	1.3	0.03	0.30	5.8	5.9	12574.	1.3	0.03	0.30	0.5
1.30- 1.40	84.7	85.5	12565.	1.6	0.03	0.24	90.5	91.4	12566.	1.6	0.03	0.24	0.4
1.40- 1.60	8.2	7.7	11697.	6.7	0.05	0.29	98.7	99.1	12493.	2.0	0.03	0.25	0.4
SINK 1.60	1.3	0.9	8431.	36.5	0.10	0.25	100.0	100.0	12441.	2.4	0.03	0.25	0.4
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	74.9	76.4	12682.	1.1	0.01	0.27	74.9	76.4	12682.	1.1	0.01	0.27	0.4
1.40- 1.60	17.2	17.1	12312.	4.1	0.02	0.34	92.1	93.5	12613.	1.7	0.01	0.28	0.4
SINK 1.60	7.9	6.5	10299.	17.2	0.09	0.26	100.0	100.0	12430.	2.9	0.02	0.28	0.5
SAMPLE MESH SIZE													
PLUS 65	1.7	1.7	12635.	2.0	0.02	0.26	1.7	1.7	12635.	2.0	0.02	0.26	0.4
65 - 100	6.1	6.2	12622.	1.7	0.02	0.26	7.8	7.9	12625.	1.8	0.02	0.26	0.4
100 - 200	26.9	27.2	12550.	1.8	0.02	0.26	34.7	35.1	12567.	1.8	0.02	0.26	0.4
200 - 325	23.1	23.4	12544.	2.1	0.02	0.25	57.8	58.5	12558.	1.9	0.02	0.26	0.4
MINUS 325	42.2	41.5	12207.	4.7	0.02	0.25	100.0	100.0	12410.	3.1	0.02	0.25	0.4

TABLE XXXIV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 126

STATE: ALASKA
COUNTY: BARROW-POINT HOPE
TOWN: POINT LAY

MINE: KOKOLIK RIVER
COALBED: 11.5 FT BED
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	1.9	2.1	13923.	2.2	0.03	0.18	1.9	2.1	13923.	2.2	0.03	0.18	0.3
1.30- 1.40	79.3	83.2	13434.	2.6	0.03	0.27	81.3	85.3	13446.	2.6	0.03	0.27	0.4
1.40- 1.60	13.5	12.5	11876.	10.2	0.03	0.19	94.7	97.7	13223.	3.6	0.03	0.26	0.4
SINK 1.60	5.3	2.3	5489.	51.5	0.03	0.12	100.0	100.0	12814.	6.2	0.03	0.25	0.4
MINUS 100	1.8	1.4	10063.	23.4	0.03	0.21	100.0	100.0	12766.	6.5	0.03	0.25	0.4
3/8 X 0													
FLOAT 1.30	11.9	12.8	13765.	2.3	0.03	0.23	11.9	12.8	13765.	2.3	0.03	0.23	0.3
1.30- 1.40	72.2	75.5	13451.	3.3	0.03	0.30	84.2	88.3	13496.	3.2	0.03	0.29	0.4
1.40- 1.60	10.2	9.4	11868.	10.6	0.03	0.18	94.4	97.7	13320.	4.0	0.03	0.28	0.4
SINK 1.60	5.7	2.3	5325.	53.5	0.03	0.14	100.0	100.0	12868.	6.8	0.03	0.27	0.4
MINUS 100	2.5	2.2	11307.	14.6	0.03	0.20	100.0	100.0	12830.	6.9	0.03	0.27	0.4
14 M X 0													
FLOAT 1.30	1.6	1.8	14239.	3.0	0.03	0.31	1.6	1.8	14239.	3.0	0.03	0.31	0.4
1.30- 1.40	80.6	84.5	13404.	3.1	0.03	0.25	82.2	86.3	13420.	3.1	0.03	0.25	0.4
1.40- 1.60	12.5	11.6	11840.	10.5	0.03	0.21	94.8	97.9	13211.	4.0	0.03	0.25	0.4
SINK 1.60	5.3	2.1	5087.	58.8	0.03	0.21	100.0	100.0	12785.	6.9	0.03	0.24	0.4
65 M X 0													
FLOAT 1.30	5.6	6.3	14426.	1.0	0.02	0.26	5.6	6.3	14426.	1.0	0.02	0.26	0.4
1.30- 1.40	68.5	72.7	13588.	1.5	0.02	0.26	74.0	79.0	13651.	1.5	0.02	0.26	0.4
1.40- 1.60	14.5	14.1	12401.	8.1	0.02	0.23	88.6	93.1	13446.	2.6	0.02	0.26	0.4
SINK 1.60	11.4	6.9	7778.	40.8	0.01	0.16	100.0	100.0	12798.	7.0	0.02	0.24	0.4
SAMPLE MESH SIZE													
PLUS 65	2.2	2.2	12911.	7.1	0.02	0.27	2.2	2.2	12911.	7.1	0.02	0.27	0.4
65 - 100	6.9	7.0	12962.	6.8	0.02	0.28	9.1	9.2	12950.	6.9	0.02	0.28	0.4
100 - 200	27.8	28.5	13094.	5.4	0.02	0.28	36.9	37.7	13059.	5.8	0.02	0.28	0.4
200 - 325	21.3	21.9	13103.	5.1	0.02	0.28	58.2	59.5	13075.	5.6	0.02	0.28	0.4
MINUS 325	41.8	40.5	12388.	9.4	0.01	0.26	100.0	100.0	12788.	7.2	0.02	0.27	0.4

TABLE XXXV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 127

STATE: ALASKA
COUNTY: KENAI-COOK INLET
TOWN: TYONEK

MINE: BELUGA COAL
COALBED: CAPPS
COMPANY: BELUGA COAL CO

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	0.9	0.9	10447.	5.9	0.03	0.24	0.9	0.9	10447.	5.9	0.03	0.24	0.5
1.30- 1.40	71.8	78.4	10661.	8.0	0.03	0.19	72.7	79.3	10658.	8.0	0.03	0.19	0.4
1.40- 1.60	21.4	17.6	8069.	27.3	0.03	0.16	94.0	96.9	10070.	12.3	0.03	0.18	0.4
SINK 1.60	6.0	3.1	5047.	56.5	0.03	0.13	100.0	100.0	9770.	15.0	0.03	0.18	0.4
MINUS 100	1.8	1.2	6194.	42.3	0.04	0.15	100.0	100.0	9706.	15.5	0.03	0.18	0.4
3/8 X 0													
FLOAT 1.30	26.6	30.6	11115.	3.8	0.03	0.19	26.6	30.6	11115.	3.8	0.03	0.19	0.3
1.30- 1.40	47.0	49.3	10125.	9.6	0.03	0.15	73.6	80.0	10483.	7.5	0.03	0.16	0.3
1.40- 1.60	19.6	16.8	8242.	25.4	0.03	0.10	93.3	96.7	10011.	11.3	0.03	0.15	0.3
SINK 1.60	6.7	3.3	4699.	54.1	0.03	0.11	100.0	100.0	9654.	14.2	0.03	0.15	0.3
MINUS 100	1.9	1.4	6956.	36.4	0.04	0.15	100.0	100.0	9605.	14.6	0.03	0.15	0.3
14 M X 0													
FLOAT 1.30	19.5	23.4	11782.	3.8	0.03	0.17	19.5	23.4	11782.	3.8	0.03	0.17	0.3
1.30- 1.40	24.8	27.4	10860.	7.6	0.01	0.17	44.4	50.9	11266.	5.9	0.02	0.17	0.3
1.40- 1.60	51.9	47.2	8937.	21.5	0.03	0.19	96.2	98.0	10011.	14.4	0.02	0.18	0.4
SINK 1.60	3.8	2.0	5072.	46.6	0.03	0.17	100.0	100.0	9824.	15.6	0.03	0.18	0.4
65 M X 0													
FLOAT 1.30	0.7	0.9	12264.	2.6	0.02	0.28	0.7	0.9	12264.	2.6	0.02	0.28	0.5
1.30- 1.40	39.3	45.6	11225.	4.6	0.02	0.26	39.9	46.5	11242.	4.6	0.02	0.26	0.5
1.40- 1.60	50.3	47.8	9173.	17.7	0.02	0.25	90.2	94.3	10089.	11.9	0.02	0.25	0.5
SINK 1.60	9.8	5.7	5678.	49.0	0.02	0.24	100.0	100.0	9658.	15.5	0.02	0.25	0.5
SAMPLE MESH SIZE													
PLUS 65	7.7	8.1	10073.	11.4	0.03	0.25	7.7	8.1	10073.	11.4	0.03	0.25	0.5
65 - 100	7.6	8.0	10174.	10.4	0.02	0.25	15.3	16.1	10123.	10.9	0.03	0.25	0.5
100 - 200	29.7	30.9	9971.	12.0	0.03	0.25	45.0	47.0	10023.	11.6	0.03	0.25	0.5
200 - 325	15.2	15.7	9909.	13.7	0.02	0.25	60.2	62.8	9994.	12.2	0.03	0.25	0.5
MINUS 325	39.8	37.2	8969.	20.5	0.02	0.22	100.0	100.0	9586.	15.5	0.02	0.24	0.5

TABLE XXXVI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 128

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: KOYUKUK

MINE: NULATO
COALBED: 12 INCH
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	23.6						23.6						
3/8 X 14 MESH	70.5						94.1						
14 M X 100 M	5.2						99.3						
MINUS 100 M	0.7						100.0						
1 1/2 X 0													
FLOAT 1.30	5.9	14.3	14368.	5.7	0.05	0.94	5.9	14.3	14368.	5.7	0.05	0.94	1.3
1.30- 1.40	10.4	24.7	14118.	7.6	0.05	0.94	16.4	39.0	14209.	6.9	0.05	0.94	1.3
1.40- 1.60	2.8	4.9	10493.	28.9	0.08	1.17	19.1	43.8	13672.	10.1	0.05	0.97	1.4
SINK 1.60	80.9	56.2	4143.	72.8	0.05	0.51	100.0	100.0	5965.	60.8	0.05	0.60	2.0
MINUS 100	0.7	1.0	8799.	37.3	0.05	1.26	100.0	100.0	5984.	60.6	0.05	0.60	2.0
3/8 X 0													
FLOAT 1.30	3.6	9.1	14606.	4.4	0.05	1.01	3.6	9.1	14606.	4.4	0.05	1.01	1.4
1.30- 1.40	8.0	19.5	13998.	7.2	0.05	0.94	11.6	28.6	14186.	6.4	0.05	0.96	1.4
1.40- 1.60	4.9	9.4	11020.	25.5	0.08	0.94	16.5	38.0	13243.	12.0	0.06	0.96	1.4
SINK 1.60	83.5	62.0	4259.	77.4	0.10	0.43	100.0	100.0	5738.	66.6	0.09	0.52	1.8
MINUS 100	2.9	4.2	8378.	41.0	0.05	1.25	100.0	100.0	5812.	65.9	0.09	0.54	1.8
14 M X 0													
FLOAT 1.30	0.7	2.0	14734.	4.4	0.05	0.91	0.7	2.0	14734.	4.4	0.05	0.91	1.2
1.30- 1.40	2.4	6.6	14402.	4.5	0.05	0.91	3.1	8.6	14476.	4.5	0.05	0.91	1.3
1.40- 1.60	5.6	12.9	12083.	14.1	0.08	0.81	8.7	21.4	12940.	10.7	0.07	0.85	1.3
SINK 1.60	91.3	78.6	4540.	69.8	0.10	0.58	100.0	100.0	5274.	64.6	0.10	0.60	2.3
65 M X 0													
FLOAT 1.30	2.2	6.4	14784.	2.5	0.02	0.86	2.2	6.4	14784.	2.5	0.02	0.86	1.2
1.30- 1.40	10.1	25.2	12903.	6.8	0.02	0.84	12.3	31.6	13244.	6.0	0.02	0.84	1.3
1.40- 1.60	8.9	19.1	11107.	25.5	0.05	1.05	21.2	50.7	12348.	14.2	0.03	0.93	1.5
SINK 1.60	78.8	49.3	3229.	74.7	0.25	0.69	100.0	100.0	5162.	61.8	0.20	0.74	2.9
SAMPLE MESH SIZE													
PLUS 65	1.0	0.9	4677.	65.6	0.16	0.67	1.0	0.9	4677.	65.6	0.16	0.67	2.9
65 - 100	5.0	4.8	4918.	64.2	0.16	0.64	5.9	5.7	4879.	64.4	0.16	0.64	2.6
100 - 200	16.7	19.8	6029.	58.1	0.17	0.69	22.6	25.4	5727.	59.8	0.17	0.68	2.4
200 - 325	12.4	11.1	4574.	67.9	0.18	0.72	35.0	36.6	5319.	62.6	0.17	0.69	2.6
MINUS 325	65.0	63.4	4978.	64.6	0.16	0.86	100.0	100.0	5098.	63.9	0.17	0.76	2.9

TABLE XXXVII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 129

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: HEALY

MINE: USIBELLI
COALBED: NO. ONE
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	56.6						56.6						
3/8 X 14 MESH	40.6						97.2						
14 M X 100 M	1.6						98.8						
MINUS 100 M	1.2						100.0						
1 1/2 X 0													
FLOAT 1.30	7.1	8.0	11405.	6.9	0.01	0.17	7.1	8.0	11405.	6.9	0.01	0.17	0.3
1.30- 1.40	76.3	81.6	10807.	10.3	0.01	0.16	83.4	89.5	10858.	10.0	0.01	0.16	0.3
1.40- 1.60	10.3	8.0	7875.	31.2	0.03	0.27	93.7	97.5	10531.	12.3	0.01	0.17	0.3
SINK 1.60	6.3	2.5	3956.	73.2	0.03	0.15	100.0	100.0	10114.	16.2	0.01	0.17	0.3
MINUS 100	1.2	0.7	6203.	49.2	0.03	0.42	100.0	100.0	10068.	16.6	0.01	0.17	0.3
3/8 X 0													
FLOAT 1.30	59.3	65.6	11186.	9.9	0.01	0.19	59.3	65.6	11186.	9.9	0.01	0.19	0.3
1.30- 1.40	26.9	25.7	9646.	14.9	0.01	0.21	86.2	91.3	10705.	11.5	0.01	0.20	0.4
1.40- 1.60	6.8	5.7	8442.	26.3	0.03	0.26	93.1	97.0	10539.	12.6	0.01	0.20	0.4
SINK 1.60	6.9	3.0	4387.	66.4	0.03	0.19	100.0	100.0	10111.	16.3	0.01	0.20	0.4
MINUS 100	2.5	2.4	9544.	17.2	0.04	0.24	100.0	100.0	10097.	16.4	0.01	0.20	0.4
14 M X 0													
FLOAT 1.30	10.8	12.8	11562.	6.9	0.01	0.17	10.8	12.8	11562.	6.9	0.01	0.17	0.3
1.30- 1.40	64.4	68.5	10455.	9.4	0.01	0.19	75.2	81.3	10614.	9.1	0.01	0.19	0.4
1.40- 1.60	15.9	14.7	9116.	19.8	0.03	0.23	91.1	96.0	10353.	10.9	0.01	0.19	0.4
SINK 1.60	8.9	4.0	4349.	70.1	0.03	0.12	100.0	100.0	9817.	16.2	0.01	0.19	0.4
65 M X 0													
FLOAT 1.30	32.7	38.1	10897.	6.8	0.01	0.28	32.7	38.1	10897.	6.8	0.01	0.28	0.5
1.30- 1.40	12.2	14.2	10902.	7.1	0.01	0.29	44.9	52.4	10898.	6.9	0.01	0.28	0.5
1.40- 1.60	35.4	36.9	9746.	12.9	0.01	0.32	80.3	89.3	10390.	9.5	0.01	0.30	0.6
SINK 1.60	19.7	10.7	5071.	51.5	0.02	0.27	100.0	100.0	9342.	17.8	0.01	0.29	0.6
SAMPLE MESH SIZE													
PLUS 65	12.3	12.9	10050.	13.1	0.01	0.28	12.3	12.9	10050.	13.1	0.01	0.28	0.6
65 - 100	10.4	10.8	9971.	12.4	0.01	0.27	22.7	23.8	10014.	12.8	0.01	0.28	0.6
100 - 200	28.2	29.5	9994.	13.7	0.01	0.26	50.9	53.3	10003.	13.3	0.01	0.27	0.5
200 - 325	16.4	16.8	9815.	14.7	0.01	0.26	67.2	70.1	9957.	13.6	0.01	0.27	0.5
MINUS 325	32.8	29.9	8711.	23.8	0.01	0.27	100.0	100.0	9549.	17.0	0.01	0.27	0.6

TABLE XXXVIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 130

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: HEALY

MINE: USIBELLI
COALBED: NO. THREE
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	82.9						82.9						
3/8 X 14 MESH	14.0						96.9						
14 M X 100 M	1.7						98.6						
MINUS 100 M	1.4						100.0						
1 1/2 X 0													
FLOAT 1.30	16.1	17.7	11466.	4.6	0.01	0.09	16.1	17.7	11466.	4.6	0.01	0.09	0.2
1.30- 1.40	69.1	72.3	10881.	6.8	0.04	0.13	85.2	90.1	10991.	6.4	0.03	0.12	0.2
1.40- 1.60	6.6	5.1	7973.	13.4	0.01	0.28	91.8	95.1	10774.	6.9	0.03	0.13	0.2
SINK 1.60	8.2	4.9	6194.	68.8	0.01	0.29	100.0	100.0	10400.	12.0	0.03	0.15	0.3
MINUS 100	1.4	0.9	7049.	36.8	0.01	0.22	100.0	100.0	10354.	12.3	0.03	0.15	0.3
3/8 X 0													
FLOAT 1.30	12.6	14.3	11556.	4.4	0.01	0.16	12.6	14.3	11556.	4.4	0.01	0.16	0.3
1.30- 1.40	73.1	77.6	10852.	6.8	0.03	0.21	85.8	91.9	10956.	6.4	0.03	0.20	0.4
1.40- 1.60	4.8	3.9	8259.	23.5	0.01	0.26	90.5	95.7	10814.	7.3	0.03	0.21	0.4
SINK 1.60	9.5	4.3	4634.	66.3	0.01	0.12	100.0	100.0	10229.	12.9	0.02	0.20	0.4
MINUS 100	3.2	2.7	8557.	24.5	0.01	0.17	100.0	100.0	10177.	13.3	0.02	0.20	0.4
14 M X 0													
FLOAT 1.30	15.3	17.2	11659.	4.6	0.01	0.15	15.3	17.2	11659.	4.6	0.01	0.15	0.3
1.30- 1.40	68.4	72.1	10924.	9.1	0.03	0.16	83.8	89.4	11058.	8.3	0.03	0.16	0.3
1.40- 1.60	9.1	7.9	9023.	17.9	0.01	0.23	92.8	97.2	10860.	9.2	0.02	0.17	0.3
SINK 1.60	7.2	2.8	3988.	70.9	0.01	0.10	100.0	100.0	10366.	13.7	0.02	0.16	0.3
65 M X 0													
FLOAT 1.30	1.0	1.1	11559.	2.1	0.02	0.14	1.0	1.1	11559.	2.1	0.02	0.14	0.2
1.30- 1.40	50.5	54.8	11262.	4.3	0.04	0.14	51.6	56.0	11268.	4.3	0.04	0.14	0.2
1.40- 1.60	36.2	36.5	10477.	6.8	0.03	0.15	87.8	92.5	10942.	5.3	0.04	0.14	0.3
SINK 1.60	12.2	7.5	6362.	68.3	0.02	0.16	100.0	100.0	10382.	13.0	0.03	0.15	0.3
SAMPLE MESH SIZE													
PLUS 65	6.8	7.7	12121.	12.6	0.04	0.24	6.8	7.7	12121.	12.6	0.04	0.24	0.4
65 - 100	10.4	10.5	10721.	13.2	0.02	0.11	17.2	18.2	11274.	12.9	0.03	0.16	0.3
100 - 200	32.9	33.6	10871.	13.8	0.02	0.14	50.1	51.8	11009.	13.5	0.02	0.15	0.3
200 - 325	15.3	15.2	10606.	13.2	0.02	0.12	65.4	66.9	10915.	13.4	0.02	0.14	0.3
MINUS 325	34.7	33.1	10176.	13.6	0.02	0.19	100.0	100.0	10659.	13.5	0.02	0.15	0.3

TABLE XXXIX
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 131

STATE: ALASKA
COUNTY: KENAI-COOK INLET
TOWN: HAPPY VALLEY

MINE: HAPPY VALLEY
COALBED: HAPPY VALLEY
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	7.6	8.5	11875.	5.3	0.03	0.32	7.6	8.5	11875.	5.3	0.03	0.32	0.5
1.30- 1.40	79.2	82.0	10997.	9.4	0.04	0.40	86.8	90.5	11074.	9.0	0.04	0.39	0.7
1.40- 1.60	9.4	6.8	7701.	31.5	0.06	0.42	96.2	97.3	10744.	11.2	0.04	0.40	0.7
SINK 1.60	3.8	2.7	7633.	73.3	0.10	0.12	100.0	100.0	10625.	13.6	0.04	0.39	0.7
MINUS 100	1.0	0.5	5174.	53.4	0.04	0.22	100.0	100.0	10571.	14.0	0.04	0.38	0.7
3/8 X 0													
FLOAT 1.30	16.0	17.7	11801.	5.4	0.04	0.38	16.0	17.7	11801.	5.4	0.04	0.38	0.6
1.30- 1.40	72.1	74.9	11021.	8.8	0.04	0.44	88.1	92.6	11162.	8.2	0.04	0.43	0.8
1.40- 1.60	7.8	6.0	8125.	31.5	0.05	0.42	95.9	98.6	10914.	10.1	0.04	0.43	0.8
SINK 1.60	4.1	1.4	3564.	75.3	0.10	0.14	100.0	100.0	10614.	12.7	0.04	0.42	0.8
MINUS 100	4.2	2.5	6173.	48.6	0.03	0.21	100.0	100.0	10438.	14.2	0.04	0.41	0.8
14 M X 0													
FLOAT 1.30	12.1	13.4	11811.	5.8	0.03	0.36	12.1	13.4	11811.	5.8	0.03	0.36	0.6
1.30- 1.40	76.2	78.4	10950.	9.1	0.03	0.41	88.3	91.9	11068.	8.6	0.03	0.40	0.7
1.40- 1.60	6.8	6.1	9580.	27.7	0.05	0.46	95.1	98.0	10961.	10.0	0.03	0.41	0.7
SINK 1.60	4.9	2.0	4366.	76.9	0.12	0.19	100.0	100.0	10635.	13.3	0.04	0.40	0.7
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	28.6	33.0	11073.	5.6	0.03	0.40	28.6	33.0	11073.	5.6	0.03	0.40	0.7
1.40- 1.60	60.7	62.7	9926.	10.6	0.02	0.41	89.3	95.7	10294.	9.0	0.02	0.41	0.8
SINK 1.60	10.7	4.3	3834.	62.1	0.13	0.23	100.0	100.0	9603.	14.7	0.03	0.39	0.8
SAMPLE MESH SIZE													
PLUS 65	2.8	3.0	10368.	11.1	0.00	0.54	2.8	3.0	10368.	11.1	0.00	0.54	1.0
65 - 100	7.4	7.7	10369.	10.0	0.00	0.51	10.3	10.7	10369.	10.3	0.00	0.52	1.0
100 - 200	30.9	31.4	10075.	11.9	0.00	0.42	41.2	42.1	10148.	11.5	0.00	0.44	0.9
200 - 325	19.6	19.4	9822.	14.1	0.00	0.46	60.8	61.5	10043.	12.3	0.00	0.45	0.9
MINUS 325	39.2	38.5	9750.	16.6	0.00	0.34	100.0	100.0	9928.	14.0	0.00	0.42	0.8

TABLE XL
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 132

STATE: ALASKA
COUNTY: KOYUKUK MIDDLE YUKON
TOWN: MCKINLEY VILLAGE

MINE: YANERT
COALBED: YANERT
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	0.1	0.1	13004.	6.4	0.03	0.38	0.1	0.1	13004.	6.4	0.03	0.38	0.6
1.30- 1.40	10.8	20.8	12895.	6.8	0.03	0.35	10.8	21.0	12896.	6.8	0.03	0.35	0.5
1.40- 1.60	24.5	37.9	10298.	23.9	0.03	0.33	35.3	58.8	11094.	18.6	0.03	0.34	0.6
SINK 1.60	64.7	41.2	4234.	71.3	0.09	0.14	100.0	100.0	6656.	52.7	0.07	0.21	0.6
MINUS 100	1.4	1.5	6940.	44.4	0.03	0.26	100.0	100.0	6660.	52.6	0.07	0.21	0.6
3/8 X 0													
FLOAT 1.30	6.4	12.8	13609.	4.0	0.03	0.41	6.4	12.8	13609.	4.0	0.03	0.41	0.6
1.30- 1.40	13.9	25.9	12763.	7.3	0.03	0.45	20.3	38.8	13031.	6.3	0.03	0.44	0.7
1.40- 1.60	17.2	26.2	10373.	23.6	0.03	0.35	37.6	64.9	11812.	14.2	0.03	0.40	0.7
SINK 1.60	62.4	35.1	3837.	77.0	0.07	0.12	100.0	100.0	6832.	53.4	0.05	0.22	0.7
MINUS 100	3.1	2.1	4540.	53.8	0.03	0.48	100.0	100.0	6764.	53.4	0.05	0.23	0.7
14 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	3.0	6.5	13529.	4.0	0.03	0.41	3.0	6.5	13529.	4.0	0.03	0.41	0.6
1.40- 1.60	23.2	41.1	11099.	17.5	0.03	0.37	26.3	47.7	11379.	16.0	0.03	0.37	0.7
SINK 1.60	73.8	52.3	4445.	67.7	0.06	0.12	100.0	100.0	6265.	54.2	0.05	0.19	0.6
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	15.6	35.3	13263.	4.3	0.05	0.44	15.6	35.3	13263.	4.3	0.05	0.44	0.7
1.40- 1.60	16.3	28.2	10165.	24.5	0.05	0.37	31.9	63.4	11682.	14.6	0.05	0.40	0.7
SINK 1.60	68.1	36.6	3154.	72.4	0.07	0.13	100.0	100.0	5872.	54.0	0.06	0.22	0.7
SAMPLE MESH SIZE													
PLUS 65	17.3	17.3	5657.	53.2	0.06	0.22	17.3	17.3	5657.	53.2	0.06	0.22	0.8
65 - 100	7.1	6.7	5407.	53.5	0.06	0.22	24.3	24.0	5584.	53.3	0.06	0.22	0.8
100 - 200	21.1	24.5	6575.	47.2	0.06	0.24	45.4	48.5	6044.	50.5	0.06	0.23	0.8
200 - 325	13.0	16.7	7273.	44.4	0.06	0.26	58.4	65.1	6317.	49.1	0.06	0.24	0.7
MINUS 325	41.6	34.8	4742.	60.2	0.04	0.19	100.0	100.0	5662.	53.7	0.05	0.22	0.8

TABLE XLI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 136

STATE: ALASKA
COUNTY: DILLINGHAM
TOWN: CHIGNIK

MINE: CHIGNIK RIVER
COALBED: CHIGNIK
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	40.9						40.9						
3/8 X 14 MESH	48.1						89.0						
14 M X 100 M	9.4						98.4						
MINUS 100 M	1.6						100.0						
1 1/2 X 0													
FLOAT 1.30	5.8	9.3	13793.	4.1	0.29	1.54	5.8	9.3	13793.	4.1	0.29	1.54	2.2
1.30- 1.40	29.8	44.6	12738.	7.7	0.54	1.92	35.6	54.0	12909.	7.1	0.50	1.86	2.9
1.40- 1.60	14.7	18.9	10962.	20.5	1.01	2.02	50.3	72.9	12340.	11.0	0.65	1.91	3.1
SINK 1.60	49.8	27.1	4635.	59.5	1.22	1.51	100.0	100.0	8507.	35.1	0.93	1.71	4.0
MINUS 100	1.6	1.4	7408.	41.2	0.93	1.97	100.0	100.0	8490.	35.2	0.93	1.71	4.0
3/8 X 0													
FLOAT 1.30	4.6	7.7	13847.	3.3	0.22	1.48	4.6	7.7	13847.	3.3	0.22	1.48	2.1
1.30- 1.40	28.3	44.8	13243.	6.6	0.46	1.82	32.9	52.4	13328.	6.1	0.43	1.77	2.7
1.40- 1.60	16.8	20.9	10405.	23.0	0.81	2.02	49.7	73.4	12340.	11.8	0.56	1.86	3.0
SINK 1.60	50.3	26.6	4425.	60.2	1.22	1.68	100.0	100.0	8357.	36.1	0.89	1.77	4.2
MINUS 100	3.2	3.3	8564.	35.2	0.82	1.92	100.0	100.0	8363.	36.1	0.89	1.77	4.2
14 M X 0													
FLOAT 1.30	4.2	6.7	13711.	2.8	0.16	1.34	4.2	6.7	13711.	2.8	0.16	1.34	2.0
1.30- 1.40	31.3	46.6	12856.	8.0	0.36	1.67	35.5	53.3	12957.	7.4	0.34	1.63	2.5
1.40- 1.60	16.0	20.3	10971.	20.7	0.81	1.82	51.5	73.6	12340.	11.5	0.48	1.69	2.7
SINK 1.60	48.5	26.4	4704.	59.3	1.32	1.68	100.0	100.0	8639.	34.7	0.89	1.69	3.9
65 M X 0													
FLOAT 1.30	7.3	11.8	13944.	2.3	0.06	1.27	7.3	11.8	13944.	2.3	0.06	1.27	1.8
1.30- 1.40	30.6	48.0	13491.	4.6	0.16	1.31	37.9	59.8	13578.	4.1	0.14	1.30	1.9
1.40- 1.60	12.4	15.6	10756.	25.1	0.76	1.46	50.3	75.4	12881.	9.3	0.29	1.34	2.1
SINK 1.60	49.7	24.6	4253.	65.4	1.28	1.47	100.0	100.0	8594.	37.2	0.78	1.41	3.3
SAMPLE MESH SIZE													
PLUS 65	3.0	2.8	7865.	40.9	0.97	1.55	3.0	2.8	7865.	40.9	0.97	1.55	3.9
65 - 100	9.0	8.7	8352.	36.0	0.89	1.00	12.0	11.5	8229.	37.3	0.91	1.14	2.8
100 - 200	27.2	29.0	9226.	30.7	0.06	1.40	39.2	40.5	8920.	32.7	0.32	1.32	3.0
200 - 325	17.6	19.5	9547.	30.1	0.06	1.18	56.8	60.0	9114.	31.9	0.24	1.28	2.8
MINUS 325	43.2	40.0	7976.	40.1	0.05	1.19	100.0	100.0	8622.	35.5	0.18	1.25	2.9

TABLE XLII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 137

STATE: ALASKA
COUNTY: ALUETIAN ISLANDS
TOWN: PORT MOLLER

MINE: COAL POINT
COALBED: HERENDEEN BAY
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	42.9						42.9						
3/8 X 14 MESH	52.3						95.2						
14 M X 100 M	1.1						96.3						
MINUS 100 M	3.7						100.0						
1 1/2 X 0													
FLOAT 1.30	2.3	3.9	13527.	4.6	0.18	0.76	2.3	3.9	13527.	4.6	0.18	0.76	1.1
1.30- 1.40	29.5	47.7	12788.	10.3	0.62	1.35	31.8	51.6	12841.	9.9	0.59	1.31	2.0
1.40- 1.60	20.4	27.2	10592.	23.9	1.81	2.29	52.2	78.8	11963.	15.4	1.07	1.69	2.8
SINK 1.60	47.8	21.2	3508.	67.4	0.92	1.16	100.0	100.0	7920.	40.3	1.00	1.44	3.6
MINUS 100	3.7	2.4	5158.	67.0	0.43	0.91	100.0	100.0	7822.	41.2	0.98	1.42	3.6
3/8 X 0													
FLOAT 1.30	5.8	10.1	13794.	3.6	0.12	0.75	5.8	10.1	13794.	3.6	0.12	0.75	1.1
1.30- 1.40	29.6	48.4	13008.	8.9	0.56	1.22	35.5	58.6	13137.	8.0	0.49	1.14	1.7
1.40- 1.60	17.3	23.3	10689.	23.5	1.91	2.37	52.8	81.8	12334.	13.1	0.95	1.55	2.5
SINK 1.60	47.3	18.2	3062.	69.9	0.88	1.19	100.0	100.0	7953.	39.9	0.92	1.38	3.5
MINUS 100	6.8	3.5	4052.	62.8	0.48	0.95	100.0	100.0	7707.	41.4	0.89	1.35	3.5
14 M X 0													
FLOAT 1.30	1.1	2.0	13963.	3.5	0.07	0.68	1.1	2.0	13963.	3.5	0.07	0.68	1.0
1.30- 1.40	28.2	48.5	13215.	7.3	0.42	1.04	29.3	50.6	13244.	7.1	0.41	1.03	1.5
1.40- 1.60	10.0	14.7	11274.	19.9	1.58	2.03	39.3	65.2	12742.	10.4	0.71	1.28	2.0
SINK 1.60	60.7	34.8	4390.	61.3	0.96	1.35	100.0	100.0	7671.	41.3	0.86	1.32	3.4
65 M X 0													
FLOAT 1.30	12.9	22.5	13895.	2.2	0.06	0.71	12.9	22.5	13895.	2.2	0.06	0.71	1.0
1.30- 1.40	25.2	41.6	13065.	7.6	0.20	0.87	38.1	64.1	13345.	5.8	0.15	0.82	1.2
1.40- 1.60	13.6	16.3	9550.	31.0	0.91	1.39	51.7	80.5	12349.	12.4	0.35	0.97	1.6
SINK 1.60	48.3	19.6	3209.	73.3	1.77	1.69	100.0	100.0	7932.	41.8	1.04	1.32	3.3
SAMPLE MESH SIZE													
PLUS 65	4.5	5.7	9860.	29.5	0.91	1.04	4.5	5.7	9860.	29.5	0.91	1.04	2.1
65 - 100	6.6	7.8	9395.	31.8	1.22	1.18	11.1	13.5	9585.	30.8	1.09	1.12	2.3
100 - 200	26.0	30.5	9278.	32.4	1.26	1.42	37.1	44.0	9370.	31.9	1.21	1.33	2.8
200 - 325	18.9	21.9	9089.	34.3	1.55	1.79	56.0	65.9	9275.	32.7	1.32	1.49	3.2
MINUS 325	44.0	34.1	6119.	52.8	1.06	1.12	100.0	100.0	7887.	41.6	1.24	1.37	3.3

TABLE XLIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 138

STATE: ALASKA
COUNTY: KOBUK
TOWN: CHICAGO CREEK

MINE: CHICAGO CREEK
COALBED: THREE FT SEAM
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	25.3						25.3						
3/8 X 14 MESH	70.7						96.0						
14 M X 100 M	3.0						99.0						
MINUS 100 M	1.0						100.0						
1 1/2 X 0													
FLOAT 1.30	69.6	74.7	10412.	8.3	0.04	0.84	69.6	74.7	10412.	8.3	0.04	0.84	1.6
1.30- 1.40	17.1	17.2	9743.	11.0	0.04	0.88	86.7	91.9	10280.	8.8	0.04	0.85	1.6
1.40- 1.60	9.3	6.4	6612.	34.9	0.15	0.72	96.0	98.2	9924.	11.3	0.05	0.84	1.7
SINK 1.60	4.0	1.8	4320.	52.4	0.16	0.47	100.0	100.0	9702.	13.0	0.06	0.82	1.7
MINUS 100	1.0	0.9	8408.	25.4	0.06	0.67	100.0	100.0	9689.	13.1	0.06	0.82	1.7
3/8 X 0													
FLOAT 1.30	48.0	53.5	10742.	5.7	0.01	0.80	48.0	53.5	10742.	5.7	0.01	0.80	1.5
1.30- 1.40	26.9	28.1	10090.	7.4	0.01	0.84	75.0	81.6	10508.	6.3	0.01	0.81	1.6
1.40- 1.60	15.4	13.7	8620.	17.8	0.09	0.78	90.3	95.3	10187.	8.3	0.02	0.81	1.6
SINK 1.60	9.7	4.7	4639.	50.4	0.18	0.50	100.0	100.0	9650.	12.4	0.04	0.78	1.6
MINUS 100	3.7	3.2	8309.	27.3	0.06	0.62	100.0	100.0	9602.	12.9	0.04	0.77	1.6
14 M X 0													
FLOAT 1.30	42.3	46.0	10402.	7.7	0.02	0.83	42.3	46.0	10402.	7.7	0.02	0.83	1.6
1.30- 1.40	35.0	35.6	9736.	9.7	0.05	0.79	77.4	81.7	10100.	8.6	0.03	0.81	1.6
1.40- 1.60	9.5	8.8	8845.	16.7	0.14	0.81	86.9	90.4	9963.	9.5	0.05	0.81	1.6
SINK 1.60	13.1	9.6	6962.	34.8	0.21	0.58	100.0	100.0	9569.	12.8	0.07	0.78	1.6
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	14.6	16.7	11070.	5.6	0.05	0.97	14.6	16.7	11070.	5.6	0.05	0.97	1.8
1.40- 1.60	71.7	74.6	10118.	9.7	0.06	0.89	86.3	91.3	10279.	9.0	0.06	0.90	1.8
SINK 1.60	13.7	8.7	6194.	39.4	0.46	0.62	100.0	100.0	9720.	13.2	0.11	0.86	1.8
SAMPLE MESH SIZE													
PLUS 65	8.1	8.7	10463.	8.1	0.06	0.96	8.1	8.7	10463.	8.1	0.06	0.96	1.8
65 - 100	9.9	10.4	10224.	9.8	0.07	0.92	18.0	19.1	10332.	9.0	0.07	0.94	1.8
100 - 200	25.5	26.3	10061.	14.5	0.08	0.92	43.6	45.4	10173.	12.2	0.07	0.93	1.8
200 - 325	12.5	12.4	9661.	12.9	0.14	0.91	56.1	57.8	10059.	12.4	0.09	0.92	1.8
MINUS 325	43.9	42.2	9374.	15.1	0.14	0.75	100.0	100.0	9758.	13.6	0.10	0.87	1.8

TABLE XLIV

WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 139

STATE: ALASKA
COUNTY: BARROW-POINT HOPE
TOWN: POINT LAY

MINE: CAPE BEAUFORT
COALBED: BED 7
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	27.2						27.2						
3/8 X 14 MESH	57.6						84.8						
14 M X 100 M	26.2						111.0						
MINUS 100 M	4.0						115.0						
1 1/2 X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	11.6	14.2	11365.	5.3	0.01	0.25	11.6	14.2	11365.	5.3	0.01	0.25	0.4
1.40- 1.60	64.7	75.2	10750.	12.2	0.01	0.20	76.2	89.4	10843.	11.2	0.01	0.21	0.4
SINK 1.60	23.8	10.6	4098.	60.0	0.01	0.12	100.0	100.0	9238.	22.8	0.01	0.19	0.4
MINUS 100	4.0	2.4	5390.	49.3	0.02	0.16	100.0	100.0	9089.	23.8	0.01	0.19	0.4
3/8 X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	9.3	11.9	11712.	5.0	0.01	0.25	9.3	11.9	11712.	5.0	0.01	0.25	0.4
1.40- 1.60	63.4	75.2	10900.	10.9	0.01	0.20	72.7	87.1	11004.	10.2	0.01	0.21	0.4
SINK 1.60	27.3	12.9	4355.	57.2	0.01	0.12	100.0	100.0	9188.	23.0	0.01	0.18	0.4
MINUS 100	7.8	5.8	6683.	42.2	0.02	0.16	100.0	100.0	9007.	24.4	0.01	0.18	0.4
14 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	8.6	11.5	11737.	4.9	0.01	0.27	8.6	11.5	11737.	4.9	0.01	0.27	0.5
1.40- 1.60	51.7	64.3	10986.	9.7	0.01	0.18	60.4	75.8	11094.	9.0	0.01	0.19	0.3
SINK 1.60	39.6	24.2	5395.	50.4	0.01	0.12	100.0	100.0	8836.	25.4	0.01	0.16	0.4
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	8.3	11.0	11981.	5.1	0.01	0.23	8.3	11.0	11981.	5.1	0.01	0.23	0.4
1.40- 1.60	60.2	75.8	11346.	8.8	0.01	0.19	68.4	86.8	11423.	8.4	0.01	0.19	0.3
SINK 1.60	31.6	13.2	3762.	67.4	0.01	0.09	100.0	100.0	9005.	27.0	0.01	0.16	0.4
200 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	5.8	7.8	12022.	5.3	0.01	0.23	5.8	7.8	12022.	5.3	0.01	0.23	0.4
1.40- 1.60	62.9	80.1	11446.	8.1	0.01	0.20	68.7	87.9	11495.	7.8	0.01	0.20	0.4
SINK 1.60	31.3	12.1	3465.	69.4	0.01	0.09	100.0	100.0	8985.	27.1	0.01	0.17	0.4
325 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	3.8	5.2	12093.	5.4	0.01	0.23	3.8	5.2	12093.	5.4	0.01	0.23	0.4
1.40- 1.60	63.7	81.0	11431.	7.9	0.01	0.19	67.5	86.2	11469.	7.7	0.01	0.19	0.3
SINK 1.60	32.5	13.8	3819.	66.6	0.01	0.09	100.0	100.0	8983.	26.9	0.01	0.16	0.4
SAMPLE MESH SIZE													
PLUS 65	0.7	0.8	9979.	26.9	0.01	0.18	0.7	0.8	9979.	26.9	0.01	0.18	0.4
65 - 200	26.9	30.2	9737.	20.0	0.01	0.18	27.6	31.0	9743.	20.2	0.01	0.18	0.4
200 - 325	21.1	23.5	9659.	22.1	0.01	0.10	48.7	54.5	9707.	21.0	0.01	0.15	0.3
MINUS 325	51.3	45.5	7686.	33.3	0.01	0.16	100.0	100.0	8670.	27.3	0.01	0.15	0.4

TABLE XLV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 140

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: USIBELLI

MINE: USIBELLI
COALBED: BASAL
COMPANY: USIBELLI COAL CO.

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	48.2						48.2						
3/8 X 14 MESH	49.4						97.6						
14 M X 100 M	0.9						98.5						
MINUS 100 M	1.5						100.0						
1 1/2 X 0													
FLOAT 1.30	31.1	36.5	11230.	6.9	0.02	0.38	31.1	36.5	11230.	6.9	0.02	0.38	0.7
1.30- 1.40	42.7	45.8	10264.	12.5	0.02	0.41	73.8	82.3	10671.	10.2	0.02	0.40	0.7
1.40- 1.60	16.7	14.0	8011.	28.1	0.09	0.47	90.5	96.4	10179.	13.5	0.03	0.41	0.8
SINK 1.60	9.5	3.6	3674.	61.4	0.12	0.48	100.0	100.0	9563.	18.0	0.04	0.42	0.9
MINUS 100	1.3	0.7	4860.	47.6	0.03	0.61	100.0	100.0	9501.	18.4	0.04	0.42	0.9
3/8 X 0													
FLOAT 1.30	21.5	25.2	11365.	6.6	0.01	0.38	21.5	25.2	11365.	6.6	0.01	0.38	0.7
1.30- 1.40	54.1	56.8	10177.	13.4	0.02	0.41	75.6	82.0	10515.	11.5	0.02	0.40	0.8
1.40- 1.60	14.8	12.5	8181.	29.1	0.03	0.44	90.4	94.5	10133.	14.4	0.02	0.41	0.8
SINK 1.60	9.6	5.5	5527.	55.7	0.10	0.53	100.0	100.0	9690.	18.4	0.03	0.42	0.9
MINUS 100	5.8	4.9	8020.	25.3	0.02	0.41	100.0	100.0	9598.	18.7	0.03	0.42	0.9
14 M X 0													
FLOAT 1.30	12.6	14.7	11299.	8.1	0.01	0.33	12.6	14.7	11299.	8.1	0.01	0.33	0.6
1.30- 1.40	54.8	58.7	10386.	11.9	0.02	0.31	67.4	73.4	10557.	11.2	0.02	0.31	0.6
1.40- 1.60	23.2	20.4	8538.	23.6	0.02	0.36	90.6	93.9	10040.	14.4	0.02	0.33	0.6
SINK 1.60	9.4	6.1	6322.	48.1	0.03	0.37	100.0	100.0	9691.	17.6	0.02	0.33	0.7
65 M X 0													
FLOAT 1.30	0.1	0.1	11592.	4.9	0.02	0.41	0.1	0.1	11592.	4.9	0.02	0.41	0.7
1.30- 1.40	28.8	33.6	11474.	6.3	0.02	0.43	28.9	33.7	11474.	6.3	0.02	0.43	0.7
1.40- 1.60	50.5	52.0	10128.	15.8	0.03	0.44	79.4	85.7	10618.	12.3	0.03	0.44	0.8
SINK 1.60	20.6	14.3	6830.	44.7	0.05	0.42	100.0	100.0	9836.	19.0	0.03	0.43	0.9
SAMPLE MESH SIZE													
PLUS 65	9.8	10.4	10375.	13.5	0.02	0.41	9.8	10.4	10375.	13.5	0.02	0.41	0.8
65 - 100	14.1	14.9	10320.	13.8	0.03	0.44	23.8	25.3	10343.	13.7	0.03	0.43	0.8
100 - 200	25.8	27.2	10297.	14.1	0.03	0.44	49.6	52.5	10319.	13.9	0.03	0.43	0.8
200 - 325	14.7	15.3	10134.	15.4	0.03	0.44	64.3	67.7	10277.	14.2	0.03	0.44	0.8
MINUS 325	35.7	32.2	8806.	26.3	0.03	0.42	100.0	100.0	9751.	18.5	0.03	0.43	0.9

TABLE XLVI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 141

STATE: ALASKA
COUNTY: KOYUKUK-MIDDLE YUKON
TOWN: USIBELLI

MINE: USIBELLI
COALBED: UPPER LIGNITE CREEK
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	60.6	66.1	10681.	6.3	0.01	0.32	60.6	66.1	10681.	6.3	0.01	0.32	0.6
1.30- 1.40	28.1	27.4	9533.	16.0	0.01	0.42	88.6	93.4	10317.	9.4	0.01	0.35	0.7
1.40- 1.60	7.8	5.4	6764.	38.6	0.01	0.42	96.5	98.9	10029.	11.7	0.01	0.36	0.7
SINK 1.60	3.5	1.1	3169.	69.4	0.09	0.23	100.0	100.0	9787.	13.8	0.01	0.35	0.7
MINUS 100	1.1	0.6	5430.	53.8	0.02	0.23	100.0	100.0	9740.	14.2	0.01	0.35	0.7
3/8 X 0													
FLOAT 1.30	49.8	54.6	10668.	6.1	0.01	0.32	49.8	54.6	10668.	6.1	0.01	0.32	0.6
1.30- 1.40	38.1	37.7	9634.	13.9	0.01	0.38	87.9	92.4	10220.	9.5	0.01	0.35	0.7
1.40- 1.60	7.8	5.9	7342.	33.4	0.02	0.39	95.7	98.3	9984.	11.4	0.01	0.35	0.7
SINK 1.60	4.3	1.7	3871.	63.8	0.05	0.22	100.0	100.0	9721.	13.7	0.01	0.34	0.7
MINUS 100	0.7	0.6	7585.	25.8	0.05	0.30	100.0	100.0	9706.	13.8	0.01	0.34	0.7
14 M X 0													
FLOAT 1.30	46.0	49.9	10820.	6.3	0.01	0.34	46.0	49.9	10820.	6.3	0.01	0.34	0.6
1.30- 1.40	41.3	40.0	9658.	14.4	0.01	0.34	87.2	89.9	10270.	10.2	0.01	0.34	0.7
1.40- 1.60	7.7	6.7	8665.	24.5	0.01	0.37	94.9	96.6	10140.	11.3	0.01	0.34	0.7
SINK 1.60	5.1	3.4	6715.	39.0	0.06	0.26	100.0	100.0	9965.	12.7	0.01	0.34	0.7
65 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	16.2	18.8	10966.	3.6	0.02	0.45	16.2	18.8	10966.	3.6	0.02	0.45	0.8
1.40- 1.60	72.8	75.3	9780.	11.3	0.02	0.40	89.0	94.1	9996.	9.9	0.02	0.41	0.8
SINK 1.60	11.0	5.9	5051.	41.8	0.03	0.30	100.0	100.0	9451.	13.4	0.02	0.40	0.8
SAMPLE MESH SIZE													
PLUS 65	13.4	14.1	10317.	9.8	0.02	0.41	13.4	14.1	10317.	9.8	0.02	0.41	0.8
65 - 100	8.8	9.4	10423.	8.5	0.02	0.40	22.2	23.5	10359.	9.2	0.02	0.41	0.8
100 - 200	26.7	28.0	10256.	10.1	0.02	0.38	48.9	51.5	10303.	9.7	0.02	0.39	0.8
200 - 325	13.9	14.1	9976.	12.2	0.02	0.39	62.8	65.7	10231.	10.3	0.02	0.39	0.8
MINUS 325	37.2	34.3	9014.	20.9	0.02	0.33	100.0	100.0	9778.	14.2	0.02	0.37	0.8

TABLE XLVII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 142

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SUTTON

MINE: EVAN JONES
COALBED: BED 7A
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	55.3						55.3						
3/8 X 14 MESH	37.7						93.0						
14 M X 100 M	5.8						98.8						
MINUS 100 M	1.2						100.0						
1 1/2 X 0													
FLOAT 1.30	43.4	53.1	13932.	1.8	0.01	0.29	43.4	53.1	13932.	1.8	0.01	0.29	0.4
1.30- 1.40	23.5	26.6	12876.	8.5	0.01	0.29	67.0	79.7	13561.	4.1	0.01	0.29	0.4
1.40- 1.60	15.1	13.7	10295.	26.6	0.01	0.24	82.1	93.4	12958.	8.3	0.01	0.28	0.4
SINK 1.60	17.9	6.6	4176.	61.2	0.01	0.12	100.0	100.0	11386.	17.7	0.01	0.25	0.4
MINUS 100	1.2	0.9	8820.	38.8	0.02	0.21	100.0	100.0	11356.	18.0	0.01	0.25	0.4
3/8 X 0													
FLOAT 1.30	45.5	55.5	13873.	1.7	0.01	0.26	45.5	55.5	13873.	1.7	0.01	0.26	0.4
1.30- 1.40	21.1	24.4	13165.	7.5	0.01	0.26	66.7	79.9	13649.	3.5	0.01	0.26	0.4
1.40- 1.60	14.3	12.8	10204.	28.4	0.01	0.21	81.0	92.7	13040.	7.9	0.01	0.25	0.4
SINK 1.60	19.0	7.3	4378.	62.1	0.02	0.10	100.0	100.0	11390.	18.2	0.01	0.22	0.4
MINUS 100	6.2	5.6	10207.	24.9	0.01	0.19	100.0	100.0	11321.	18.6	0.01	0.22	0.4
14 M X 0													
FLOAT 1.30	42.6	53.9	14232.	1.5	0.01	0.23	42.6	53.9	14232.	1.5	0.01	0.23	0.3
1.30- 1.40	21.9	25.2	12958.	6.9	0.01	0.34	64.5	79.2	13800.	3.3	0.01	0.27	0.4
1.40- 1.60	11.7	10.8	10393.	23.8	0.01	0.28	76.1	89.9	13278.	6.4	0.01	0.27	0.4
SINK 1.60	23.9	10.1	4742.	56.3	0.02	0.16	100.0	100.0	11242.	18.3	0.01	0.24	0.4
65 M X 0													
FLOAT 1.30	42.3	53.0	14211.	1.7	0.01	0.32	42.3	53.0	14211.	1.7	0.01	0.32	0.5
1.30- 1.40	25.4	30.5	13642.	5.2	0.01	0.32	67.7	83.6	13998.	3.0	0.01	0.32	0.5
1.40- 1.60	9.9	9.4	10759.	22.6	0.01	0.33	77.6	93.0	13583.	5.5	0.01	0.32	0.5
SINK 1.60	22.4	7.0	3554.	67.3	0.01	0.18	100.0	100.0	11340.	19.3	0.01	0.29	0.5
200 M X 0													
FLOAT 1.30	34.4	43.1	14234.	1.9	0.01	0.30	34.4	43.1	14234.	1.9	0.01	0.30	0.4
1.30- 1.40	32.1	38.8	13753.	4.1	0.01	0.34	66.5	81.9	14002.	2.9	0.01	0.32	0.5
1.40- 1.60	10.7	10.8	11377.	18.8	0.01	0.35	77.2	92.7	13637.	5.1	0.01	0.32	0.5
SINK 1.60	22.8	7.3	3655.	66.0	0.01	0.51	100.0	100.0	11361.	19.0	0.01	0.37	0.6
325 M X 0													
FLOAT 1.30	28.0	35.3	14216.	2.0	0.01	0.31	28.0	35.3	14216.	2.0	0.01	0.31	0.4
1.30- 1.40	36.5	44.8	13847.	3.9	0.01	0.32	64.5	80.1	14007.	3.1	0.01	0.32	0.5
1.40- 1.60	11.0	11.3	11598.	17.7	0.01	0.33	75.5	91.4	13655.	5.2	0.01	0.32	0.5
SINK 1.60	24.5	8.6	3965.	65.0	0.01	0.20	100.0	100.0	11285.	19.8	0.01	0.29	0.5
SAMPLE MESH SIZE													
PLUS 65	1.1	1.0	10310.	27.1	0.01	0.33	1.1	1.0	10310.	27.3	0.01	0.33	0.6
65 - 200	32.9	33.8	11373.	19.1	0.01	0.33	34.0	34.8	11339.	19.3	0.01	0.33	0.6
200 - 325	24.0	25.2	11658.	17.0	0.01	0.34	58.0	60.0	11471.	18.4	0.01	0.33	0.6
MINUS 325	42.0	40.0	10548.	24.0	0.01	0.31	100.0	100.0	11083.	20.7	0.01	0.32	0.6

TABLE XLVIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 143

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SUTTON

MINE: EVAN JONES
COALBED: LOWER BED 7
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	56.2						56.2						
3/8 X 14 MESH	40.0						96.2						
14 M X 100 M	2.7						98.9						
MINUS 100 M	1.1						100.0						
1 1/2 X 0													
FLOAT 1.30	47.6	57.4	14089.	2.4	0.01	0.41	47.6	57.4	14089.	2.4	0.01	0.41	0.6
1.30- 1.40	18.6	20.2	12654.	11.6	0.01	0.38	66.2	77.6	13686.	5.0	0.01	0.40	0.6
1.40- 1.60	17.4	15.5	10381.	25.9	0.01	0.32	83.6	93.0	12998.	9.3	0.01	0.38	0.6
SINK 1.60	16.4	7.0	4956.	53.3	0.05	0.16	100.0	100.0	11678.	16.5	0.02	0.35	0.6
MINUS 100	1.0	0.9	10374.	24.0	0.03	0.34	100.0	100.0	11665.	16.6	0.02	0.35	0.6
3/8 X 0													
FLOAT 1.30	54.0	65.5	14122.	2.3	0.01	0.41	54.0	65.5	14122.	2.3	0.01	0.41	0.6
1.30- 1.40	14.6	15.8	12582.	10.9	0.01	0.39	68.7	81.3	13794.	4.1	0.01	0.41	0.6
1.40- 1.60	13.9	12.0	10044.	26.4	0.01	0.33	82.5	93.3	13164.	7.8	0.01	0.39	0.6
SINK 1.60	17.5	6.7	4463.	56.2	0.06	0.16	100.0	100.0	11643.	16.3	0.02	0.35	0.6
MINUS 100	4.3	4.1	11032.	19.7	0.02	0.35	100.0	100.0	11618.	16.4	0.02	0.35	0.6
14 M X 0													
FLOAT 1.30	43.1	53.0	14255.	2.5	0.01	0.40	43.1	53.0	14255.	2.5	0.01	0.40	0.6
1.30- 1.40	24.5	26.9	12765.	9.3	0.01	0.39	67.6	79.9	13716.	5.0	0.01	0.40	0.6
1.40- 1.60	14.4	13.1	10584.	23.5	0.01	0.34	82.0	93.1	13166.	8.2	0.01	0.39	0.6
SINK 1.60	18.0	6.9	4461.	56.4	0.05	0.17	100.0	100.0	11598.	16.9	0.02	0.35	0.6
65 M X 0													
FLOAT 1.30	45.6	56.7	14172.	1.7	0.01	0.44	45.6	56.7	14172.	1.7	0.01	0.44	0.6
1.30- 1.40	20.0	23.4	13396.	6.4	0.01	0.44	65.6	80.1	13936.	3.1	0.01	0.44	0.6
1.40- 1.60	12.7	11.0	9902.	27.4	0.04	0.36	78.2	91.1	13283.	7.1	0.01	0.43	0.6
SINK 1.60	21.8	8.9	4671.	58.3	0.12	0.21	100.0	100.0	11406.	18.2	0.04	0.38	0.7
SAMPLE MESH SIZE													
PLUS 65	2.5	2.5	11566.	19.1	0.04	0.38	2.5	2.5	11566.	19.1	0.04	0.38	0.7
65 - 100	9.7	9.9	11639.	18.4	0.04	0.39	12.3	12.4	11624.	18.5	0.04	0.39	0.7
100 - 200	35.6	36.0	11612.	16.7	0.05	0.39	47.8	48.5	11615.	17.1	0.05	0.39	0.7
200 - 325	21.3	21.7	11671.	15.9	0.05	0.39	69.1	70.1	11632.	16.8	0.05	0.39	0.7
MINUS 325	30.9	29.9	11086.	19.6	0.06	0.38	100.0	100.0	11463.	17.6	0.05	0.39	0.7

TABLE XLIX
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 144

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SUTTON

MINE: EVAN JONES
COALBED: UPPER BED 7
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	44.7						44.7						
3/8 X 14 MESH	52.0						96.7						
14 M X 100 M	1.9						98.6						
MINUS 100 M	1.4						100.0						
1 1/2 X 0													
FLOAT 1.30	40.3	47.4	13947.	2.5	0.01	0.36	40.3	47.4	13947.	2.5	0.01	0.36	0.5
1.30- 1.40	23.4	24.9	12588.	10.9	0.02	0.35	63.8	72.3	13448.	5.6	0.01	0.36	0.5
1.40- 1.60	28.8	24.6	10116.	26.3	0.03	0.31	92.5	96.9	12412.	12.0	0.02	0.34	0.6
SINK 1.60	7.5	3.1	4981.	52.0	0.02	0.16	100.0	100.0	11857.	15.0	0.02	0.33	0.6
MINUS 100	1.4	1.2	9891.	25.9	0.03	0.28	100.0	100.0	11830.	15.2	0.02	0.33	0.6
3/8 X 0													
FLOAT 1.30	45.2	54.2	14119.	2.3	0.01	0.35	45.2	54.2	14119.	2.3	0.01	0.35	0.5
1.30- 1.40	18.7	19.8	12522.	10.9	0.01	0.33	63.8	74.0	13652.	4.8	0.01	0.34	0.5
1.40- 1.60	26.3	22.0	9867.	27.0	0.01	0.39	90.1	96.0	12547.	11.3	0.01	0.36	0.6
SINK 1.60	9.9	4.0	4732.	53.6	0.06	0.15	100.0	100.0	11777.	15.4	0.01	0.34	0.6
MINUS 100	7.2	6.9	11369.	17.6	0.01	0.30	100.0	100.0	11749.	15.6	0.01	0.33	0.6
14 M X 0													
FLOAT 1.30	46.6	55.3	13981.	2.7	0.01	0.36	46.6	55.3	13981.	2.7	0.01	0.36	0.5
1.30- 1.40	7.0	7.6	12842.	9.2	0.01	0.34	53.6	62.9	13833.	3.6	0.01	0.36	0.5
1.40- 1.60	37.9	33.7	10479.	23.9	0.02	0.30	91.5	96.5	12444.	12.0	0.01	0.33	0.5
SINK 1.60	8.5	3.5	4793.	54.3	0.05	0.15	100.0	100.0	11791.	15.6	0.02	0.32	0.5
65 M X 0													
FLOAT 1.30	33.6	40.7	14050.	1.5	0.01	0.37	33.6	40.7	14050.	1.5	0.01	0.37	0.5
1.30- 1.40	17.3	19.6	13174.	6.5	0.02	0.37	50.8	60.2	13753.	3.2	0.01	0.37	0.5
1.40- 1.60	22.9	22.5	11404.	18.1	0.03	0.34	73.7	82.7	13024.	7.8	0.02	0.36	0.6
SINK 1.60	26.3	17.3	7618.	39.3	0.11	0.23	100.0	100.0	11603.	16.1	0.04	0.33	0.6
SAMPLE MESH SIZE													
PLUS 65	11.1	11.0	11663.	8.9	0.03	0.32	11.1	11.0	11663.	8.9	0.03	0.32	0.5
65 - 100	7.2	7.0	11438.	17.5	0.03	0.28	18.3	18.0	11575.	12.3	0.03	0.30	0.5
100 - 200	29.1	29.5	11879.	16.7	0.03	0.30	47.4	47.5	11762.	15.0	0.03	0.30	0.5
200 - 325	18.5	19.1	12083.	13.5	0.03	0.32	65.9	66.6	11852.	14.6	0.03	0.31	0.5
MINUS 325	34.1	33.4	11495.	17.1	0.03	0.30	100.0	100.0	11730.	15.4	0.03	0.31	0.5

TABLE L
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 145

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SUTTON

MINE: EVAN JONES
COALBED: LOWER BED 6
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	54.0						54.0						
3/8 X 14 MESH	43.5						97.5						
14 M X 100 M	1.5						99.0						
MINUS 100 M	1.0						100.0						
1 1/2 X 0													
FLOAT 1.30	38.5	47.5	13791.	2.3	0.01	0.29	38.5	47.5	13791.	2.3	0.01	0.29	0.4
1.30- 1.40	29.2	33.0	12647.	10.3	0.02	0.26	67.7	80.5	13298.	5.8	0.01	0.28	0.4
1.40- 1.60	13.8	12.5	10140.	25.2	0.01	0.24	81.5	93.0	12764.	9.0	0.01	0.27	0.4
SINK 1.60	18.5	7.0	4206.	62.3	0.01	0.14	100.0	100.0	11180.	18.9	0.01	0.25	0.4
MINUS 100	1.0	0.8	9373.	29.2	0.02	0.23	100.0	100.0	11163.	19.0	0.01	0.25	0.4
3/8 X 0													
FLOAT 1.30	45.1	56.7	13839.	2.9	0.01	0.30	45.1	56.7	13839.	2.9	0.01	0.30	0.4
1.30- 1.40	20.9	24.3	12826.	8.6	0.02	0.28	66.0	81.0	13518.	4.7	0.01	0.29	0.4
1.40- 1.60	13.8	12.9	10362.	23.9	0.02	0.25	79.8	93.9	12974.	8.0	0.01	0.29	0.4
SINK 1.60	20.3	6.1	3291.	67.7	0.02	0.12	100.0	100.0	11013.	20.1	0.02	0.25	0.5
MINUS 100	8.3	6.9	9060.	31.4	0.01	0.22	100.0	100.0	10863.	21.0	0.02	0.25	0.5
14 M X 0													
FLOAT 1.30	29.4	36.7	13780.	2.3	0.01	0.29	29.4	36.7	13780.	2.3	0.01	0.29	0.4
1.30- 1.40	28.2	33.3	13034.	7.7	0.01	0.30	57.5	70.0	13415.	4.9	0.01	0.29	0.4
1.40- 1.60	22.6	21.7	10602.	23.1	0.01	0.26	80.1	91.7	12622.	10.1	0.01	0.29	0.5
SINK 1.60	19.9	8.3	4617.	59.3	0.02	0.16	100.0	100.0	11027.	19.9	0.01	0.26	0.5
65 M X 0													
FLOAT 1.30	36.5	46.3	13908.	1.9	0.05	0.23	36.5	46.3	13908.	1.9	0.05	0.23	0.3
1.30- 1.40	23.2	27.4	12936.	7.9	0.02	0.37	59.8	73.7	13530.	4.3	0.04	0.28	0.4
1.40- 1.60	20.2	18.5	10047.	23.9	0.04	0.30	79.9	92.2	12651.	9.2	0.04	0.29	0.5
SINK 1.60	20.1	7.8	4260.	61.9	0.06	0.17	100.0	100.0	10967.	19.8	0.04	0.26	0.5
SAMPLE MESH SIZE													
PLUS 65	2.0	2.1	11861.	13.3	0.04	0.33	2.0	2.1	11861.	13.3	0.04	0.33	0.6
65 - 100	7.9	8.2	11200.	18.7	0.04	0.32	9.9	10.3	11330.	17.6	0.04	0.32	0.6
100 - 200	33.9	35.3	11341.	18.0	0.04	0.31	43.7	45.5	11339.	18.0	0.04	0.31	0.6
200 - 325	20.6	21.4	11294.	18.8	0.04	0.32	64.4	66.9	11324.	18.2	0.04	0.32	0.6
MINUS 325	35.6	33.1	10107.	25.6	0.03	0.28	100.0	100.0	10891.	20.8	0.04	0.31	0.6

TABLE LI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 146

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SUTTON

MINE: EVAN JONES
COALBED: UPPER BED 6
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	14.2	19.7	13858.	3.8	0.01	0.40	14.2	19.7	13858.	3.8	0.01	0.40	0.6
1.30- 1.40	30.6	38.0	12379.	10.7	0.01	0.38	44.8	57.7	12847.	8.5	0.01	0.39	0.6
1.40- 1.60	31.4	31.8	10084.	27.4	0.02	0.34	76.2	89.4	11708.	16.3	0.01	0.37	0.6
SINK 1.60	23.8	10.6	4437.	61.9	0.03	0.17	100.0	100.0	9979.	27.1	0.02	0.32	0.6
MINUS 100	1.0	0.8	8201.	38.1	0.05	0.32	100.0	100.0	9962.	27.2	0.02	0.32	0.6
3/8 X 0													
FLOAT 1.30	16.1	23.2	13970.	3.7	0.01	0.45	16.1	23.2	13970.	3.7	0.01	0.45	0.6
1.30- 1.40	25.0	32.8	12712.	10.9	0.01	0.37	41.0	56.0	13205.	8.0	0.01	0.40	0.6
1.40- 1.60	28.2	30.1	10321.	26.2	0.02	0.34	69.2	86.1	12031.	15.4	0.01	0.38	0.6
SINK 1.60	30.8	13.9	4372.	62.4	0.04	0.14	100.0	100.0	9670.	29.9	0.02	0.30	0.6
MINUS 100	14.3	14.1	9470.	29.4	0.04	0.32	100.0	100.0	9645.	29.8	0.02	0.31	0.6
14 M X 0													
FLOAT 1.30	11.4	16.5	13958.	2.5	0.01	0.41	11.4	16.5	13958.	2.5	0.01	0.41	0.6
1.30- 1.40	18.8	25.0	12791.	9.1	0.01	0.38	30.2	41.6	13231.	6.6	0.01	0.39	0.6
1.40- 1.60	30.5	34.2	10769.	21.3	0.01	0.32	60.7	75.7	11994.	14.0	0.01	0.36	0.6
SINK 1.60	39.3	24.3	5930.	51.8	0.02	0.20	100.0	100.0	9609.	28.8	0.01	0.29	0.6
65 M X 0													
FLOAT 1.30	12.8	18.8	13935.	2.1	0.01	0.42	12.8	18.8	13935.	2.1	0.01	0.42	0.6
1.30- 1.40	24.5	33.8	13082.	7.0	0.01	0.39	37.3	52.6	13375.	5.3	0.01	0.40	0.6
1.40- 1.60	22.0	24.9	10706.	22.9	0.02	0.33	59.4	77.5	12384.	11.9	0.01	0.37	0.6
SINK 1.60	40.6	22.5	5260.	57.7	0.09	0.19	100.0	100.0	9491.	30.5	0.04	0.30	0.6
SAMPLE MESH SIZE													
PLUS 65	3.3	3.0	8589.	35.7	0.03	0.28	3.3	3.0	8589.	35.7	0.03	0.28	0.7
65 - 100	8.7	8.1	8681.	35.6	0.03	0.27	12.0	11.1	8656.	35.7	0.03	0.27	0.6
100 - 200	28.6	28.4	9287.	30.8	0.03	0.29	40.6	39.5	9101.	32.3	0.03	0.28	0.6
200 - 325	17.9	19.1	10030.	26.3	0.03	0.30	58.5	58.7	9384.	30.4	0.03	0.29	0.6
MINUS 325	41.5	41.3	9313.	30.9	0.03	0.30	100.0	100.0	9355.	30.6	0.03	0.29	0.6

TABLE LII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 147

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SUTTON

MINE: EVAN JONES
COALBED: BED 5
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	34.6		34.6										
3/8 X 14 MESH	51.7		86.3										
14 M X 100 M	12.4		98.7										
MINUS 100 M	1.3		100.0										
1 1/2 X 0													
FLOAT 1.30	11.7	18.8	13963.	2.9	0.01	0.34	11.7	18.8	13963.	2.9	0.01	0.34	0.5
1.30- 1.40	22.0	32.1	12686.	10.1	0.01	0.34	33.7	50.8	13129.	7.6	0.01	0.34	0.5
1.40- 1.60	22.5	27.1	10521.	24.1	0.02	0.32	56.2	77.9	12087.	14.2	0.01	0.33	0.5
SINK 1.60	43.8	22.1	4389.	61.0	0.08	0.19	100.0	100.0	8712.	34.7	0.04	0.27	0.6
MINUS 100	1.3	0.9	5819.	50.6	0.09	0.26	100.0	100.0	8675.	34.9	0.04	0.27	0.6
3/8 X 0													
FLOAT 1.30	11.2	17.4	13926.	2.9	0.01	0.30	11.2	17.4	13926.	2.9	0.01	0.30	0.4
1.30- 1.40	27.1	38.7	12902.	9.0	0.01	0.30	38.3	56.1	13202.	7.2	0.01	0.30	0.5
1.40- 1.60	20.1	23.1	10351.	25.6	0.04	0.26	58.4	79.2	12220.	13.5	0.02	0.29	0.5
SINK 1.60	41.6	20.8	4518.	59.6	0.06	0.17	100.0	100.0	9019.	32.7	0.04	0.24	0.5
MINUS 100	2.5	1.9	6817.	44.2	0.07	0.25	100.0	100.0	8965.	33.0	0.04	0.24	0.5
14 M X 0													
FLOAT 1.30	4.2	6.3	14091.	3.0	0.01	0.31	4.2	6.3	14091.	3.0	0.01	0.31	0.4
1.30- 1.40	28.5	42.3	13858.	5.6	0.01	0.31	32.7	48.6	13888.	5.3	0.01	0.31	0.4
1.40- 1.60	21.8	24.9	10672.	22.6	0.04	0.27	54.5	73.5	12601.	12.2	0.02	0.29	0.5
SINK 1.60	45.5	26.5	5436.	55.2	0.06	0.17	100.0	100.0	9341.	31.8	0.04	0.24	0.5
65 M X 0													
FLOAT 1.30	16.5	24.7	14023.	2.7	0.01	0.43	16.5	24.7	14023.	2.7	0.01	0.43	0.6
1.30- 1.40	26.8	38.0	13300.	6.6	0.02	0.43	43.4	62.8	13576.	5.1	0.02	0.43	0.6
1.40- 1.60	16.0	18.7	10954.	21.6	0.02	0.38	59.4	81.5	12869.	9.5	0.02	0.42	0.6
SINK 1.60	40.6	18.5	4275.	64.2	0.11	0.22	100.0	100.0	9376.	31.8	0.05	0.34	0.7
200 M X 0													
FLOAT 1.30	11.4	16.9	14090.	2.7	0.01	0.43	11.4	16.9	14090.	2.7	0.01	0.43	0.6
1.30- 1.40	35.3	50.2	13494.	5.9	0.01	0.43	46.7	67.2	13640.	5.2	0.01	0.43	0.6
1.40- 1.60	13.2	15.8	11325.	19.8	0.02	0.39	60.0	83.0	13128.	8.4	0.01	0.42	0.6
SINK 1.60	40.0	17.0	4037.	65.0	0.12	0.29	100.0	100.0	9487.	31.1	0.06	0.37	0.8
325 M X 0													
FLOAT 1.30	3.4	5.2	14220.	2.7	0.01	0.43	3.4	5.2	14220.	2.7	0.01	0.43	0.6
1.30- 1.40	41.9	61.0	13678.	5.1	0.02	0.44	45.4	66.1	13719.	4.9	0.02	0.44	0.6
1.40- 1.60	14.0	16.6	11190.	20.0	0.02	0.38	59.3	82.7	13123.	8.5	0.02	0.43	0.6
SINK 1.60	40.7	17.3	3993.	65.9	0.11	0.26	100.0	100.0	9409.	31.8	0.06	0.36	0.8
SAMPLE MESH SIZE													
PLUS 65	1.3	1.2	7993.	35.6	0.01	0.28	1.3	1.2	7993.	35.6	0.01	0.28	0.7
65 - 200	33.3	34.8	9194.	28.3	0.01	0.31	34.5	36.0	9150.	28.6	0.01	0.31	0.7
200 - 325	34.0	35.2	9079.	29.0	0.01	0.32	68.6	71.2	9115.	28.8	0.01	0.31	0.7
MINUS 325	31.4	28.8	8052.	37.8	0.01	0.28	100.0	100.0	8781.	31.6	0.01	0.30	0.7

TABLE LIII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 148

STATE: ALASKA
COUNTY: KENAI-COOK INLET
TOWN: TYONEK

MINE: BELUGA COAL
COALBED: TON 6 FT WATERFALL
COMPANY: BELUGA COAL CO

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
1 1/2 X 0													
FLOAT 1.30	13.9	22.8	11436.	4.1	0.01	0.23	13.9	22.8	11436.	4.1	0.01	0.23	0.4
1.30- 1.40	28.4	41.2	10138.	12.3	0.04	0.30	42.3	64.0	10566.	9.6	0.03	0.28	0.5
1.40- 1.60	20.8	22.3	7502.	31.3	0.07	0.33	63.0	86.3	9557.	16.7	0.04	0.29	0.6
SINK 1.60	38.0	14.7	2708.	72.3	0.05	0.13	101.0	101.0	6983.	37.6	0.05	0.23	0.7
MINUS 100	1.1	0.7	4154.	58.0	0.04	0.20	100.0	100.0	6952.	37.8	0.05	0.23	0.7
3/8 X 0													
FLOAT 1.30	11.6	18.8	11486.	3.6	0.01	0.24	11.6	18.8	11486.	3.6	0.01	0.24	0.4
1.30- 1.40	29.3	43.3	10526.	11.3	0.02	0.29	41.0	62.1	10799.	9.1	0.02	0.28	0.5
1.40- 1.60	18.3	20.2	7891.	22.3	0.08	0.31	59.2	82.3	9902.	13.2	0.04	0.29	0.6
SINK 1.60	40.8	17.7	3088.	68.2	0.02	0.14	100.0	100.0	7122.	35.6	0.03	0.23	0.6
MINUS 100	2.5	1.4	3848.	50.8	0.05	0.19	100.0	100.0	7042.	36.0	0.03	0.23	0.6
14 M X 0													
FLOAT 1.30	0.0	0.0	0.	0.0	0.00	0.00	0.0	0.0	0.	0.0	0.00	0.00	0.0
1.30- 1.40	10.4	16.8	11099.	5.1	0.02	0.25	10.4	16.8	11099.	5.1	0.02	0.25	0.5
1.40- 1.60	51.4	60.0	8045.	25.1	0.05	0.36	61.8	76.8	8561.	21.7	0.04	0.34	0.8
SINK 1.60	38.2	23.2	4189.	57.3	0.04	0.22	100.0	100.0	6893.	35.3	0.04	0.30	0.9
65 M X 0													
FLOAT 1.30	0.2	0.3	10911.	5.5	0.02	0.35	0.2	0.3	10911.	5.5	0.02	0.35	0.6
1.30- 1.40	30.4	46.7	10752.	6.3	0.02	0.34	30.6	46.9	10753.	6.3	0.02	0.34	0.6
1.40- 1.60	13.1	13.9	7400.	33.0	0.02	0.27	43.7	60.8	9746.	14.3	0.02	0.32	0.7
SINK 1.60	56.3	39.2	4869.	53.1	0.05	0.21	100.0	100.0	6999.	36.2	0.04	0.26	0.7
SAMPLE MESH SIZE													
PLUS 65	4.0	6.2	10293.	10.8	0.00	0.42	4.0	6.2	10293.	10.8	0.00	0.42	0.8
65 - 100	9.5	14.6	10189.	11.0	0.00	0.40	13.5	20.8	10220.	10.9	0.00	0.41	0.8
100 - 200	19.2	28.2	9722.	14.5	0.00	0.40	32.7	48.9	9927.	13.1	0.00	0.40	0.8
200 - 325	10.7	14.5	9029.	20.2	0.00	0.40	43.4	63.4	9706.	14.8	0.00	0.40	0.8
MINUS 325	56.6	36.5	4286.	57.0	0.00	0.23	100.0	100.0	6638.	38.7	0.00	0.34	0.9

TABLE LIV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 149

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SKWENTNA

MINE: MOBILE OIL CO
COALBED: JOHNSON CREEK 20 FT
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	63.9						63.9						
3/8 X 14 MESH	28.2						92.1						
14 M X 100 M	1.2						93.3						
MINUS 100 M	6.7						100.0						
1 1/2 X 0													
FLOAT 1.30	32.0	36.5	11283.	5.2	0.01	0.25	32.0	36.5	11283.	5.2	0.01	0.25	0.4
1.30- 1.40	47.3	49.9	10443.	10.8	0.01	0.26	79.2	86.4	10782.	8.5	0.01	0.26	0.5
1.40- 1.60	14.3	11.1	7673.	28.8	0.01	0.24	93.5	97.5	10307.	11.6	0.01	0.25	0.5
SINK 1.60	6.5	2.5	3831.	64.2	0.03	0.14	100.0	100.0	9888.	15.0	0.01	0.25	0.5
MINUS 100	1.0	0.6	5797.	40.6	0.02	0.19	100.0	100.0	9848.	15.3	0.01	0.25	0.5
3/8 X 0													
FLOAT 1.30	30.4	34.3	11427.	5.0	0.01	0.23	30.4	34.3	11427.	5.0	0.01	0.23	0.4
1.30- 1.40	50.4	52.4	10546.	9.3	0.04	0.24	80.8	86.7	10878.	7.7	0.03	0.24	0.4
1.40- 1.60	13.1	10.6	8167.	25.9	0.01	0.22	93.9	97.3	10499.	10.2	0.03	0.23	0.4
SINK 1.60	6.1	2.7	4446.	65.8	0.02	0.13	100.0	100.0	10130	13.6	0.03	0.23	0.4
MINUS 100	4.2	3.1	7373.	29.6	0.02	0.20	100.0	100.0	10020.	14.2	0.03	0.23	0.5
14 M X 0													
FLOAT 1.30	26.1	28.3	10750.	4.9	0.01	0.24	26.1	28.3	10750.	4.9	0.01	0.24	0.4
1.30- 1.40	44.9	48.5	10749.	9.0	0.08	0.25	71.1	76.8	10749.	7.5	0.05	0.25	0.5
1.40- 1.60	16.9	14.6	8625.	23.8	0.01	0.21	87.9	91.4	10342.	10.6	0.05	0.24	0.5
SINK 1.60	12.1	8.6	7094.	39.7	0.07	0.17	100.0	100.0	9950.	14.1	0.05	0.23	0.5
65 M X 0													
FLOAT 1.30	0.9	1.2	12321.	3.9	0.01	0.27	0.9	1.2	12321.	3.9	0.01	0.27	0.4
1.30- 1.40	47.6	57.0	11446.	7.2	0.01	0.25	48.6	58.2	11463.	7.2	0.01	0.25	0.4
1.40- 1.60	40.6	41.8	9854.	16.2	0.01	0.25	89.2	99.9	10731.	11.3	0.01	0.25	0.5
SINK 1.60	10.9	0.1	55.	53.1	0.02	0.29	100.0	100.0	9572.	15.8	0.01	0.25	0.5
200 M X 0													
FLOAT 1.30	0.3	0.3	11146.	6.4	0.01	0.22	0.3	0.3	11146.	6.4	0.01	0.22	0.4
1.30- 1.40	43.3	49.2	11538.	6.4	0.01	0.19	43.6	49.6	11535.	6.4	0.01	0.19	0.3
1.40- 1.60	44.2	43.7	10034.	14.4	0.01	0.17	87.7	93.3	10780.	10.4	0.01	0.18	0.3
SINK 1.60	12.3	6.7	5552.	53.1	0.03	0.24	100.0	100.0	10137.	15.7	0.01	0.19	0.4
325 M X 0													
FLOAT 1.30	0.6	0.6	11309.	5.9	0.01	0.21	0.6	0.6	11309.	5.9	0.01	0.21	0.4
1.30- 1.40	33.0	37.6	11568.	5.7	0.01	0.20	33.6	38.2	11564.	5.7	0.01	0.20	0.3
1.40- 1.60	54.2	55.6	10448.	12.6	0.01	0.11	87.8	93.8	10875.	9.9	0.01	0.14	0.3
SINK 1.60	12.2	6.2	5138.	55.9	0.02	0.18	100.0	100.0	10173.	15.5	0.01	0.15	0.3
SAMPLE MESH SIZE													
PLUS 65	2.1	2.2	10540.	10.3	0.01	0.26	2.1	2.2	10540.	10.3	0.01	0.26	0.5
65 - 200	39.3	42.1	10447.	12.1	0.01	0.24	41.4	44.4	10452.	12.0	0.01	0.24	0.5
200 - 325	19.5	20.4	10183.	15.3	0.01	0.23	60.9	64.8	10366.	13.0	0.01	0.24	0.5
MINUS 325	39.1	35.2	8789.	16.8	0.01	0.21	100.0	100.0	9749.	14.5	0.01	0.23	0.5

TABLE LV
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 150

STATE: ALASKA
COUNTY: MATANUSKA-SUSITNA
TOWN: SKWENTNA

MINE: MOBILE OIL CO
COALBED: CANYON CREEK 34 FT
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	86.4						86.4						
3/8 X 14 MESH	12.2						98.6						
14 M X 100 M	0.5						99.1						
MINUS 100 M	0.9						100.0						
1 1/2 X 0													
FLOAT 1.30	18.3	20.4	11657.	4.9	0.01	0.19	18.3	20.4	11657.	4.9	0.01	0.19	0.3
1.30- 1.40	52.9	54.2	10707.	11.4	0.01	0.18	71.2	74.6	10951.	9.8	0.01	0.18	0.3
1.40- 1.60	20.9	21.4	10737.	27.3	0.01	0.14	92.1	96.0	10902.	13.7	0.01	0.17	0.3
SINK 1.60	7.9	4.0	5233.	55.2	0.02	0.10	100.0	100.0	10452.	17.0	0.01	0.17	0.3
MINUS 100	0.9	0.5	5718.	41.0	0.02	0.14	100.0	100.0	10408.	17.3	0.01	0.17	0.3
3/8 X 0													
FLOAT 1.30	21.8	25.5	11873.	4.4	0.01	0.18	21.8	25.5	11873.	4.4	0.01	0.18	0.3
1.30- 1.40	51.2	55.0	10884.	9.0	0.01	0.17	73.0	80.5	11179.	7.7	0.01	0.17	0.3
1.40- 1.60	18.4	15.2	8354.	26.0	0.02	0.14	91.4	95.7	10611.	11.3	0.01	0.17	0.3
SINK 1.60	8.6	4.3	5093.	55.8	0.01	0.08	100.0	100.0	10138.	15.1	0.01	0.16	0.3
MINUS 100	4.5	3.3	7237.	32.4	0.01	0.13	100.0	100.0	10013.	15.9	0.01	0.16	0.3
14 M X 0													
FLOAT 1.30	23.1	27.2	11640.	4.4	0.01	0.17	23.1	27.2	11640.	4.4	0.01	0.17	0.3
1.30- 1.40	40.4	44.9	10971.	8.2	0.01	0.15	63.5	72.2	11214.	6.8	0.01	0.16	0.3
1.40- 1.60	21.0	18.5	8675.	23.3	0.01	0.13	84.5	90.7	10583.	10.9	0.01	0.15	0.3
SINK 1.60	15.5	9.3	5940.	47.7	0.02	0.09	100.0	100.0	9864.	16.6	0.01	0.14	0.3
65 M X 0													
FLOAT 1.30	0.4	0.5	11973.	2.2	0.01	0.24	0.4	0.5	11973.	2.2	0.01	0.24	0.4
1.30- 1.40	53.3	61.7	11683.	5.7	0.01	0.24	53.7	62.3	11685.	5.7	0.01	0.24	0.4
1.40- 1.60	26.8	25.7	9670.	18.5	0.01	0.23	80.5	88.0	11015.	10.0	0.01	0.24	0.4
SINK 1.60	19.5	12.1	6241.	51.8	0.01	0.16	100.0	100.0	10085.	18.1	0.01	0.22	0.4
SAMPLE MESH SIZE													
PLUS 65	4.9	5.1	10319.	1.9	0.01	0.21	4.9	5.1	10319.	1.9	0.01	0.21	0.4
65 - 100	12.1	13.2	10856.	11.2	0.01	0.21	17.0	18.3	10701.	8.5	0.01	0.21	0.4
100 - 200	32.0	34.0	10602.	12.7	0.01	0.22	49.0	52.3	10636.	11.2	0.01	0.22	0.4
200 - 325	16.5	17.0	10306.	14.6	0.01	0.22	65.5	69.3	10553.	12.1	0.01	0.22	0.4
MINUS 325	34.5	30.7	8840.	26.9	0.01	0.19	100.0	100.0	9961.	17.2	0.01	0.21	0.4

TABLE LVI
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 151

STATE: ALASKA
COUNTY: NOME
TOWN: UNALAKLEET

MINE: UNALAKLEET
COALBED: BEACH BLUFF
COMPANY: INACTIVE

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	CUMULATIVE LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	45.2						45.2						
3/8 X 14 MESH	46.6						91.8						
14 M X 100 M	4.9						96.7						
MINUS 100 M	3.3						100.0						
1 1/2 X 0													
FLOAT 1.30	43.8	46.8	11792.	5.9	0.01	0.52	43.8	46.8	11792.	5.9	0.01	0.52	0.9
1.30- 1.40	48.2	48.7	11128.	6.3	0.02	0.67	92.0	95.5	11444.	6.1	0.02	0.60	1.0
1.40- 1.60	4.0	3.1	8663.	26.6	0.03	0.53	96.0	98.6	11328.	7.0	0.02	0.60	1.1
SINK 1.60	4.0	1.4	3698.	59.1	0.03	0.29	100.0	100.0	11021.	9.1	0.02	0.58	1.1
MINUS 100	3.3	2.5	8184.	28.5	0.07	0.63	100.0	100.0	10929.	9.7	0.02	0.58	1.1
3/8 X 0													
FLOAT 1.30	41.5	44.1	11792.	6.7	0.03	0.58	41.5	44.1	11792.	6.7	0.03	0.58	1.0
1.30- 1.40	49.3	49.3	11095.	6.4	0.01	0.63	90.8	93.4	11413.	6.5	0.02	0.61	1.1
1.40- 1.60	5.6	4.6	9051.	22.3	0.02	0.48	96.4	97.9	11276.	7.5	0.02	0.60	1.1
SINK 1.60	3.6	2.1	6421.	58.9	0.04	0.36	100.0	100.0	11103.	9.3	0.02	0.59	1.1
MINUS 100	5.6	4.0	7713.	32.0	0.08	0.66	100.0	100.0	10923.	10.5	0.02	0.59	1.1
14 M X 0													
FLOAT 1.30	27.8	30.6	12052.	6.5	0.01	0.64	27.8	30.6	12052.	6.5	0.01	0.64	1.1
1.30- 1.40	57.8	59.6	11265.	6.4	0.02	0.76	85.6	90.2	11520.	6.4	0.02	0.72	1.3
1.40- 1.60	7.1	6.2	9670.	17.2	0.02	0.63	92.6	96.5	11379.	7.3	0.02	0.71	1.3
SINK 1.60	7.4	3.5	5250.	54.8	0.07	0.50	100.0	100.0	10927.	10.8	0.02	0.70	1.3
65 M X 0													
FLOAT 1.30	2.7	3.4	13605.	4.2	0.02	0.50	2.7	3.4	13605.	4.2	0.02	0.50	0.7
1.30- 1.40	67.1	71.7	11702.	6.3	0.02	0.73	69.9	75.1	11776.	6.2	0.02	0.72	1.2
1.40- 1.60	19.3	18.3	10437.	11.4	0.02	0.73	89.1	93.4	11487.	7.3	0.02	0.72	1.3
SINK 1.60	10.9	6.6	6649.	44.4	0.15	0.55	100.0	100.0	10960.	11.4	0.03	0.70	1.3
SAMPLE MESH SIZE													
PLUS 65	7.1	7.5	11540.	7.1	0.02	0.68	7.1	7.5	11540.	7.1	0.02	0.68	1.2
65 - 100	13.9	14.6	11501.	7.2	0.03	0.82	21.0	22.1	11514.	7.2	0.03	0.77	1.3
100 - 200	32.1	33.7	11411.	8.3	0.03	0.73	53.1	55.8	11452.	7.8	0.03	0.75	1.3
200 - 325	16.9	17.4	11264.	9.8	0.02	0.69	70.0	73.2	11407.	8.3	0.03	0.73	1.3
MINUS 325	30.0	26.8	9742.	21.1	0.02	0.59	100.0	100.0	10907.	12.1	0.03	0.70	1.3

TABLE LVII
WASHABILITY ANALYSIS SHOWING THE EFFECTS OF CRUSHING ON THE LIBERATION OF ASH FORMING IMPURITIES AND PYRITIC SULFUR FOR SAMPLE UA 152

STATE: ALASKA
COUNTY: KENAI-COOK INLET
TOWN: TYONEK

MINE: LONE RIDGE MINE
COALBED: GREEN
COMPANY: BELUGA COAL CO

PRODUCT	DIRECT RECOVERY WEIGHT	DIRECT RECOVERY BTU	DIRECT BTU/LB	DIRECT ASH	DIRECT SULFUR PYR	DIRECT SULFUR TOTAL	CUMULATIVE RECOVERY WEIGHT	CUMULATIVE RECOVERY BTU	CUMULATIVE BTU/LB	CUMULATIVE ASH	CUMULATIVE SULFUR PYR	CUMULATIVE SULFUR TOTAL	LB SO2/ MM BTU
SCREEN ANALYSIS													
1-1/2 X 3/8	53.2						53.2						
3/8 X 14 MESH	35.7						88.9						
14 M X 100 M	9.6						98.5						
MINUS 100 M	1.5						100.0						
1 1/2 X 0													
FLOAT 1.30	64.1	66.5	11633.	3.5	0.01	0.16	64.1	66.5	11633.	3.5	0.01	0.16	0.3
1.30- 1.40	31.4	30.8	11007.	7.2	0.01	0.19	95.5	97.4	11427.	4.7	0.01	0.17	0.3
1.40- 1.60	3.0	2.2	8464.	22.1	0.01	0.18	98.5	99.6	11338.	5.3	0.01	0.17	0.3
SINK 1.60	1.5	0.4	2727.	64.7	0.03	0.08	100.0	100.0	11205.	6.2	0.01	0.17	0.3
MINUS 100	2.2	1.5	7459.	29.0	0.04	0.17	100.0	100.0	11124.	6.7	0.01	0.17	0.3
3/8 X 0													
FLOAT 1.30	50.6	52.7	11588.	3.7	0.01	0.13	50.6	52.7	11588.	3.7	0.01	0.13	0.2
1.30- 1.40	44.2	44.3	11152.	5.2	0.01	0.18	94.8	96.9	11385.	4.4	0.01	0.15	0.3
1.40- 1.60	3.2	2.5	8882.	19.5	0.02	0.11	97.9	99.4	11304.	4.9	0.01	0.15	0.3
SINK 1.60	2.1	0.6	3049.	64.5	0.02	0.07	100.0	100.0	11132.	6.1	0.01	0.15	0.3
MINUS 100	4.2	3.5	9147.	18.6	0.02	0.15	100.0	100.0	11052.	6.6	0.01	0.15	0.3
14 M X 0													
FLOAT 1.30	51.7	54.3	11626.	3.8	0.01	0.17	51.7	54.3	11626.	3.8	0.01	0.17	0.3
1.30- 1.40	39.2	39.0	10995.	7.4	0.01	0.15	90.9	93.3	11354.	5.3	0.01	0.16	0.3
1.40- 1.60	6.4	5.7	9899.	15.1	0.01	0.16	97.3	99.0	11258.	6.0	0.01	0.16	0.3
SINK 1.60	2.7	1.0	4197.	56.9	0.03	0.10	100.0	100.0	11069.	7.4	0.01	0.16	0.3
65 M X 0													
FLOAT 1.30	0.8	0.8	11570.	2.8	0.02	0.20	0.8	0.8	11570.	2.8	0.02	0.20	0.3
1.30- 1.40	83.5	86.7	11403.	4.8	0.03	0.22	84.3	87.5	11405.	4.7	0.03	0.22	0.4
1.40- 1.60	10.4	9.2	9781.	15.1	0.02	0.24	94.7	96.7	11227.	5.9	0.03	0.22	0.4
SINK 1.60	5.3	3.3	6822.	44.2	0.04	0.16	100.0	100.0	10992.	7.9	0.03	0.22	0.4
SAMPLE MESH SIZE													
PLUS 65	12.6	13.3	11540.	5.3	0.03	0.19	12.6	13.3	11540.	5.3	0.03	0.19	0.3
65 - 100	14.4	14.8	11315.	6.4	0.05	0.20	27.0	28.1	11420.	5.9	0.04	0.20	0.3
100 - 200	29.0	30.0	11352.	6.3	0.03	0.17	56.0	58.1	11385.	6.1	0.04	0.18	0.3
200 - 325	14.2	14.5	11117.	7.7	0.02	0.19	70.2	72.6	11331.	6.4	0.03	0.18	0.3
MINUS 325	29.8	27.4	10092.	12.8	0.01	0.19	100.0	100.0	10962.	8.3	0.03	0.19	0.3

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